

Service Manual

ORDER NO.
ARP2534

FM/AM DIGITAL SYNTHESIZER TUNER

F-401L

HEX1K, HBX1K

F-401

HEWIX1K, SD

F-401L AND F-401 HAVE THE FOLLOWING :

Type	Model		Power Requirement	Remarks
	F-401L	F-401		
HEX1K	○	—	AC220-230V, 240V (switchable)*	
HBX1K	○	—	AC220-230V, 240V (switchable)*	
HEWIX1K	—	○	AC220-230V, 240V (switchable)*	
SD	—	○	AC110V, 120-127V, 220V, 240V (switchable)	

* Change the connection of the power transformer's primary wiring.

● Refer to the service manual ARP2243 for F-449/HEWZ.

- This manual is applicable to the following : F-401L/HEX1K and HBX1K ; F-401/HEWIX1K and SD.
- F-401L covers MW/LW bands while F-401 covers MW.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

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1. CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

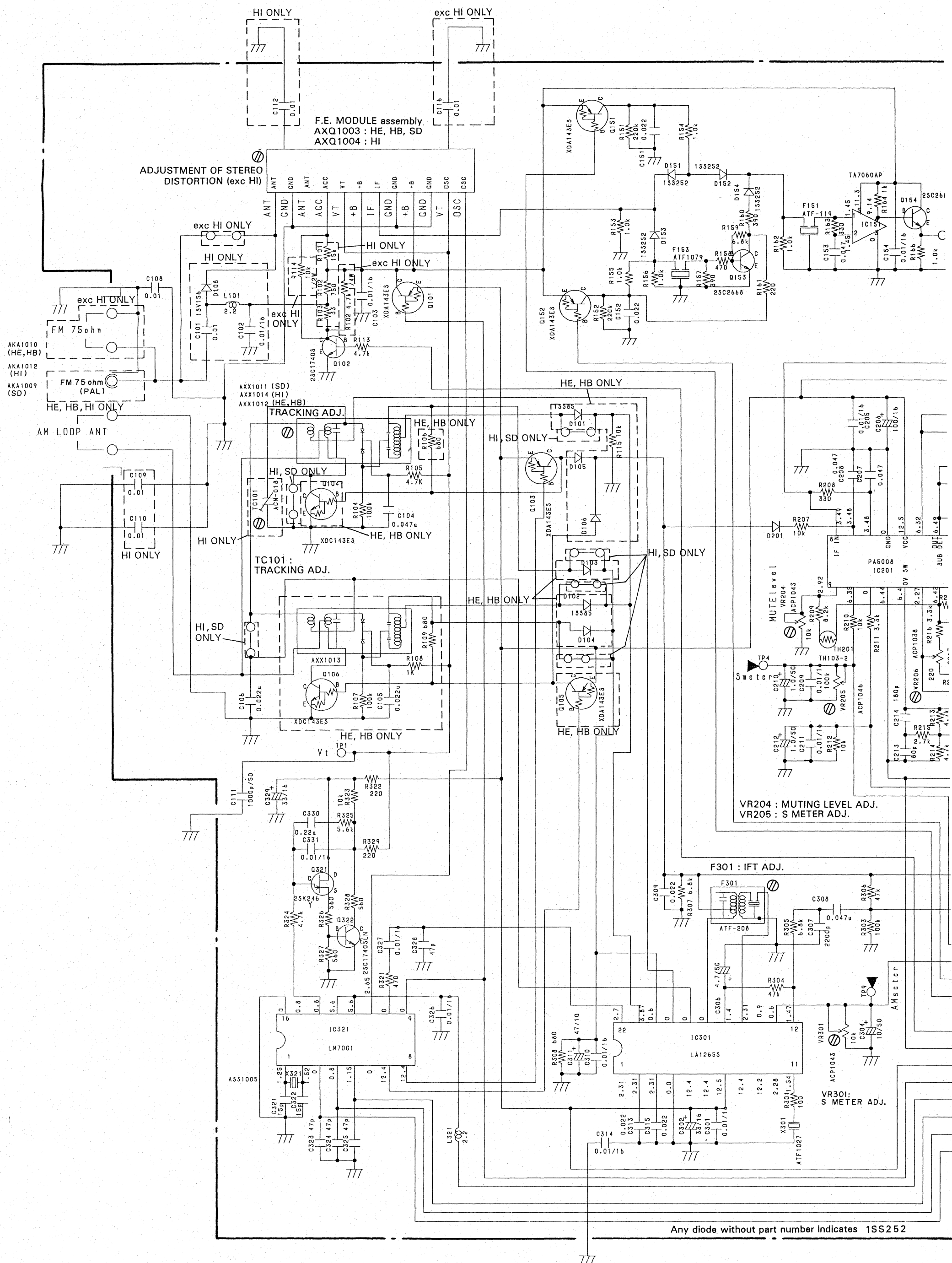
F-401L/HEX1K, HBX1K, F-401/HEWIX1K, SD and F-449/HEWZ have the same construction except for the following :

Mark	Symbol & Description	Part No.					Remarks
		F-449/ HEWZ	F-401L/ HEX1K	F-401L/ HBX1K	F-401/ HEWIX1K	F-401/ SD	
●	TUNER assembly	AWZ3643	AWZ4173	AWZ4173	AWZ4170	AWZ4171	*1
●	POWER assembly	AWZ3649	AWZ4177	AWZ4177	AWZ4174	AWZ4175	
●	DISPLAY assembly	AWP1036	AWP1039	AWP1039	AWP1039	AWP1036	
Δ	AC Power cord	ADG1021	ADG1021	ADG1085	ADG1021	ADG1051	*2
Δ	Strain relief	.....	.....	.....	.....	AEC-882
	FL filter	AAK1785	AAK1785	AAK1785	AAK1785	AAK1786	
	Screw (EARTH)	ABA1047	.....	.....	ABA1047	.....
	Screw	.....	.....	.....	.....	PBZ40P080FZK
	Front panel	ANB1451	ANB1515	ANB1515	ANB1514	ANB1514	
	Panel base	AMB1842	AMB1994	AMB1994	AMB1994	AMB1994	
	Bonnet	AZN1745	ANE1140	ANE1140	ANE1140	AZN1745	
NSP	Cushion rubber	.....	AEB1197	AEB1197	AEB1197	AEB1197
NSP	Binder	.....	.....	AEC-093	.....	.....
NSP	Rear panel	ANC1695	ANC1714	ANC1714	ANC1909	ANC1694	
	FM antenna assembly	ADH1002	ADH1002	
	FM antenna	.....	ADH1005	ADH1005	.....	ADH1005
	Front, rear pad	AHA1095	AHA1200	AHA1200	AHA1200	AHA1095	
	Packing case	AHD2056	AHD2259	AHD2259	AHD2289	AHD2258	
	Packing sheet	AHG1017	AHG1107	AHG1107	AHG1107	AHG1017	
	Operating instructions (German)	ARC1264	.....	.....	.....	.....
	Operating instructions (English, French, German, Dutch, Swedish, Italian, Spanish, Portuguese)	.....	ARE1234	.....	.....	.....
	Operating instructions (Italian)	.....	.....	.....	ARC1358	.....
	Operating instructions (English)	.....	.....	ARB1365	.....	ARB1365
	Operating instructions (English)	.....	.....	.....	.....	.....

NOTE : *1 Although DISPLAY assembly (AWP1036) and DISPLAY assembly (AWP1039) are different in part number, they have the same service parts.

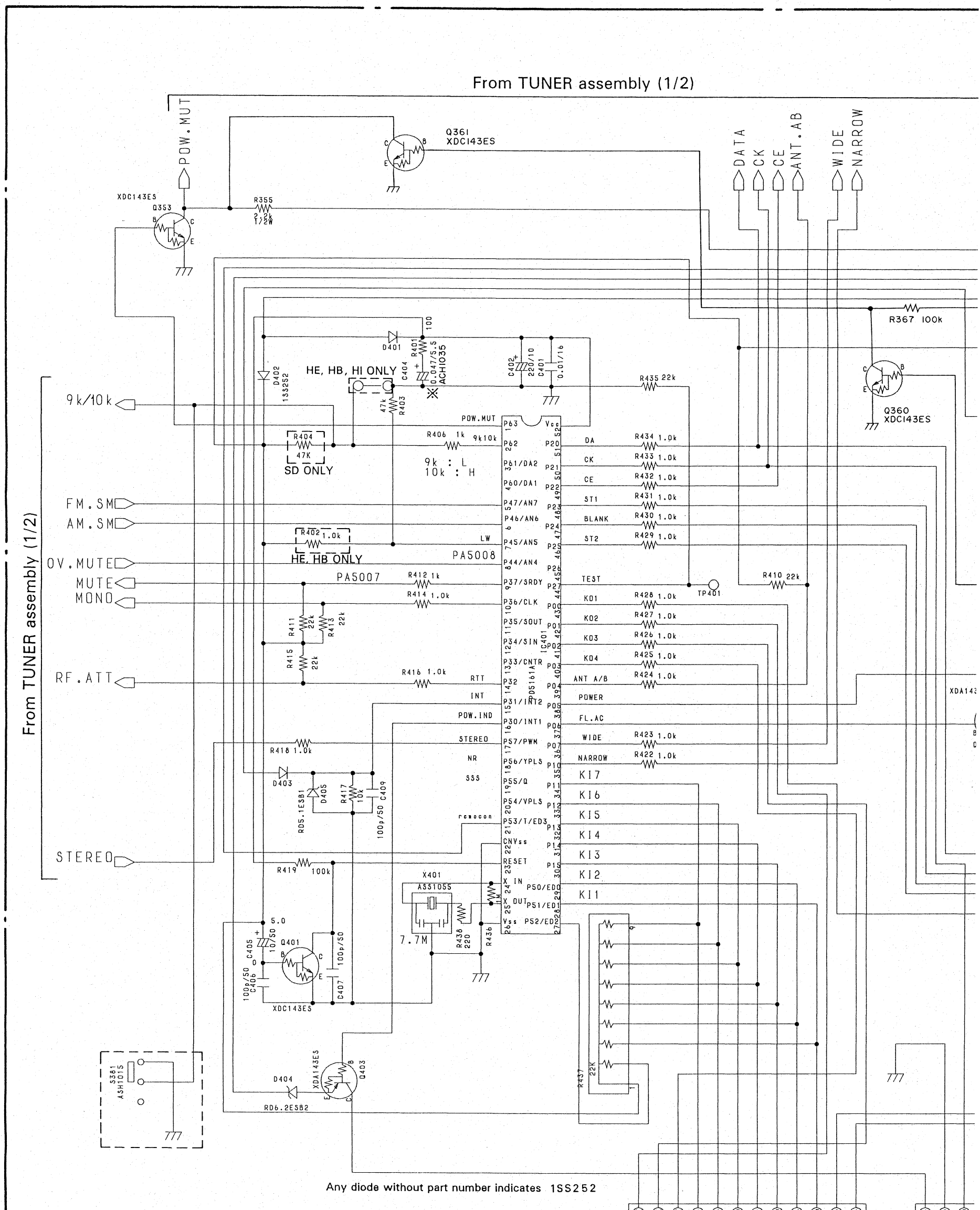
*2 For Voltage selector.

2.1 TUNER ASSEMBLY (1/2)



Any diode without part number indicates 1SS252

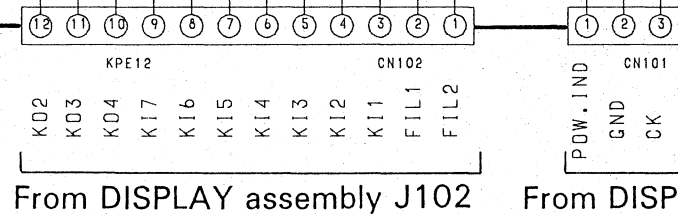
2.2 TUNER ASSEMBLY (2/2) AND POWER ASSEMBLY



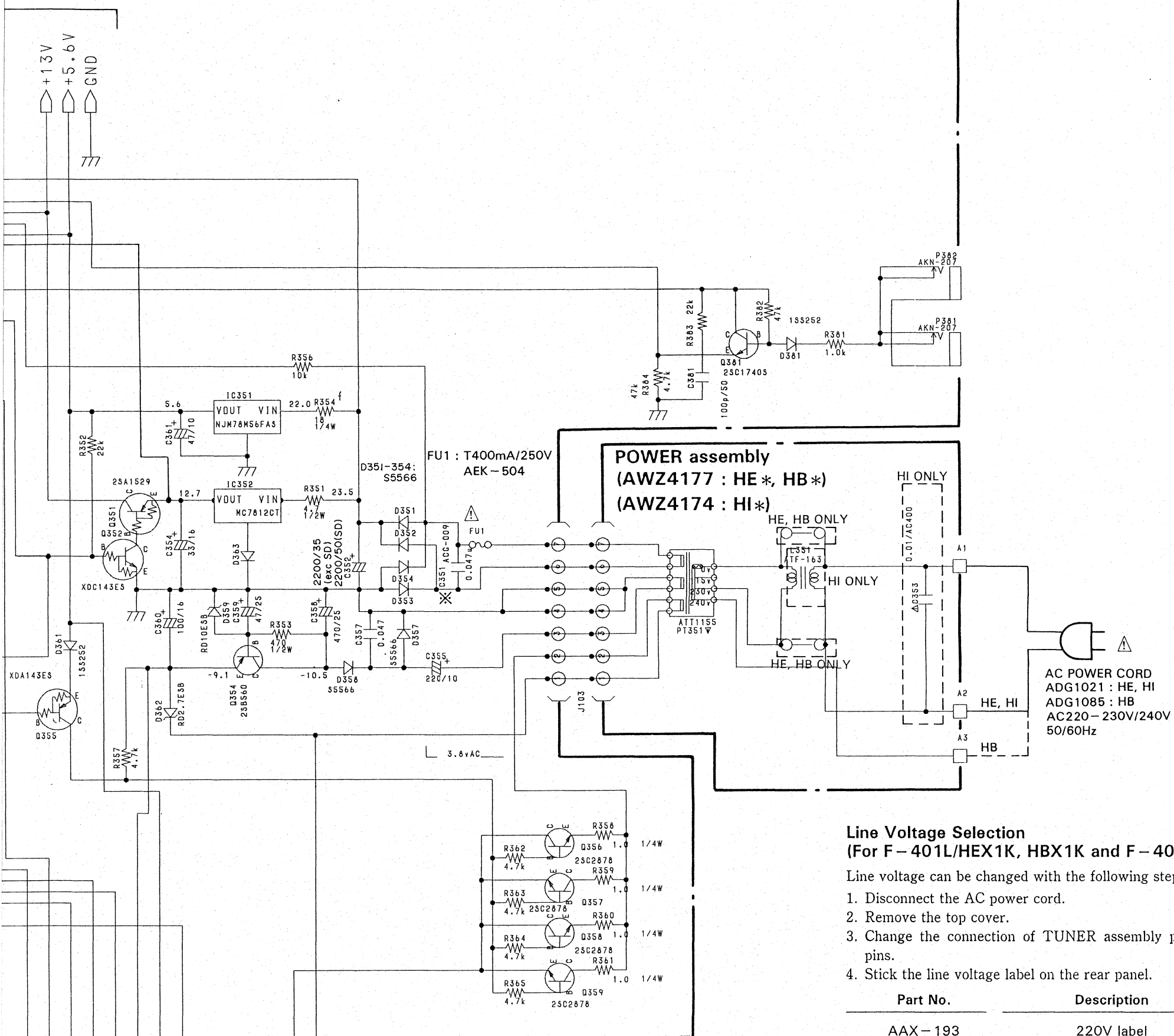
*Abbreviations in schematic diagram(s) indicate the following :

	F-401L/HEX1K F-401L/HBX1K	F-401/HEWIX1K	F-401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○
exc HI	○	—	○

○ : Applicable
— : Not applicable



TUNER assembly (2/2)(AWZ4173 : HE *, HB *)
(2/2)(AWZ4170 : HI *)
(2/2)(AWZ4171 : SD *)



Line Voltage Selection

(For F-401L/HEX1K, HBX1K and F-401/HEWIX1K)

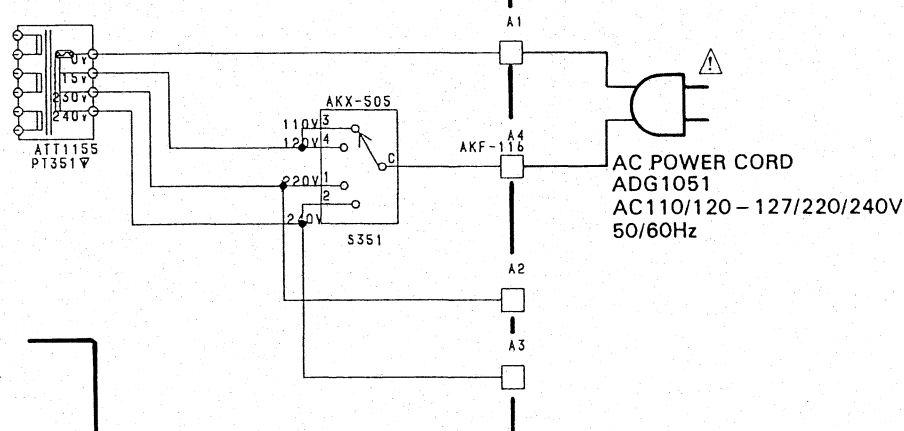
Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the top cover.
3. Change the connection of TUNER assembly primary pins.
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label

SD TYPE

**POWER assembly
(AWZ4175 : SD*)**



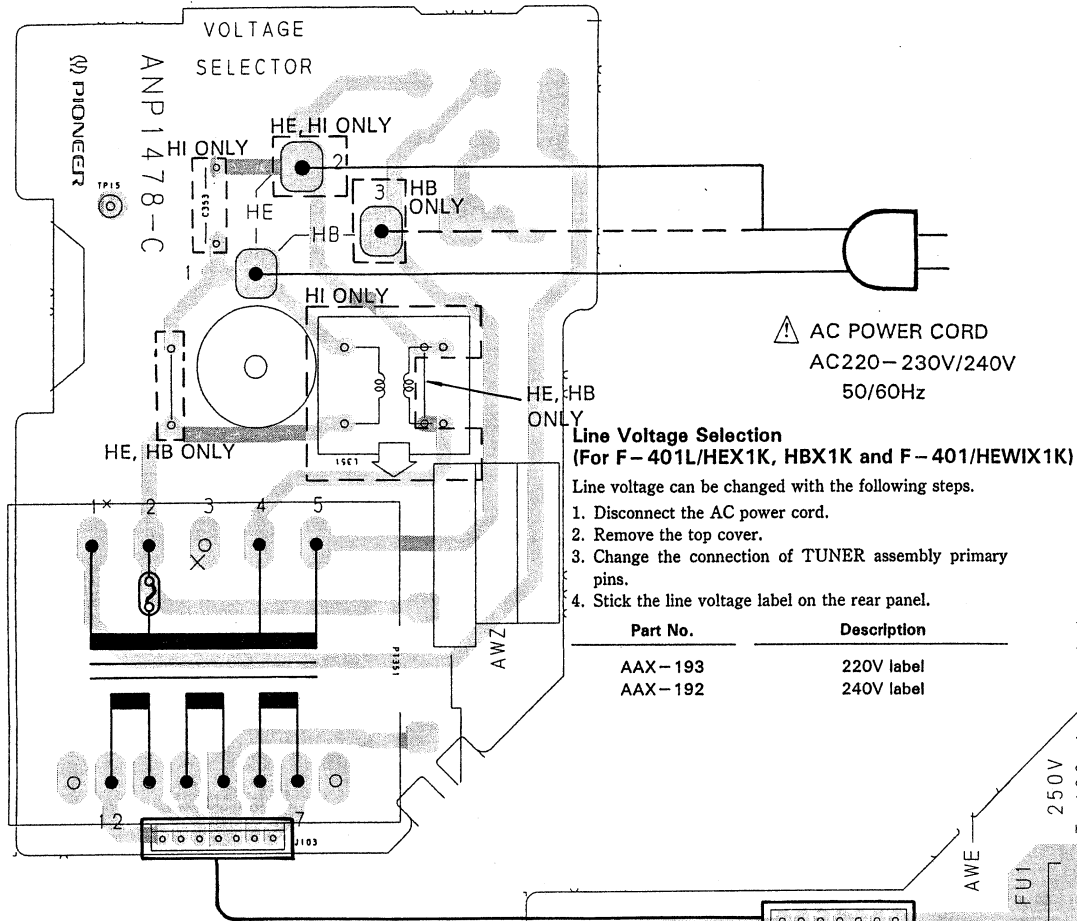
DISPLAY assembly J101

2.3 PCB PATTERNS

**POWER assembly (AWZ4177 : HE*, HB*)
(AWZ4174 : HI*)**

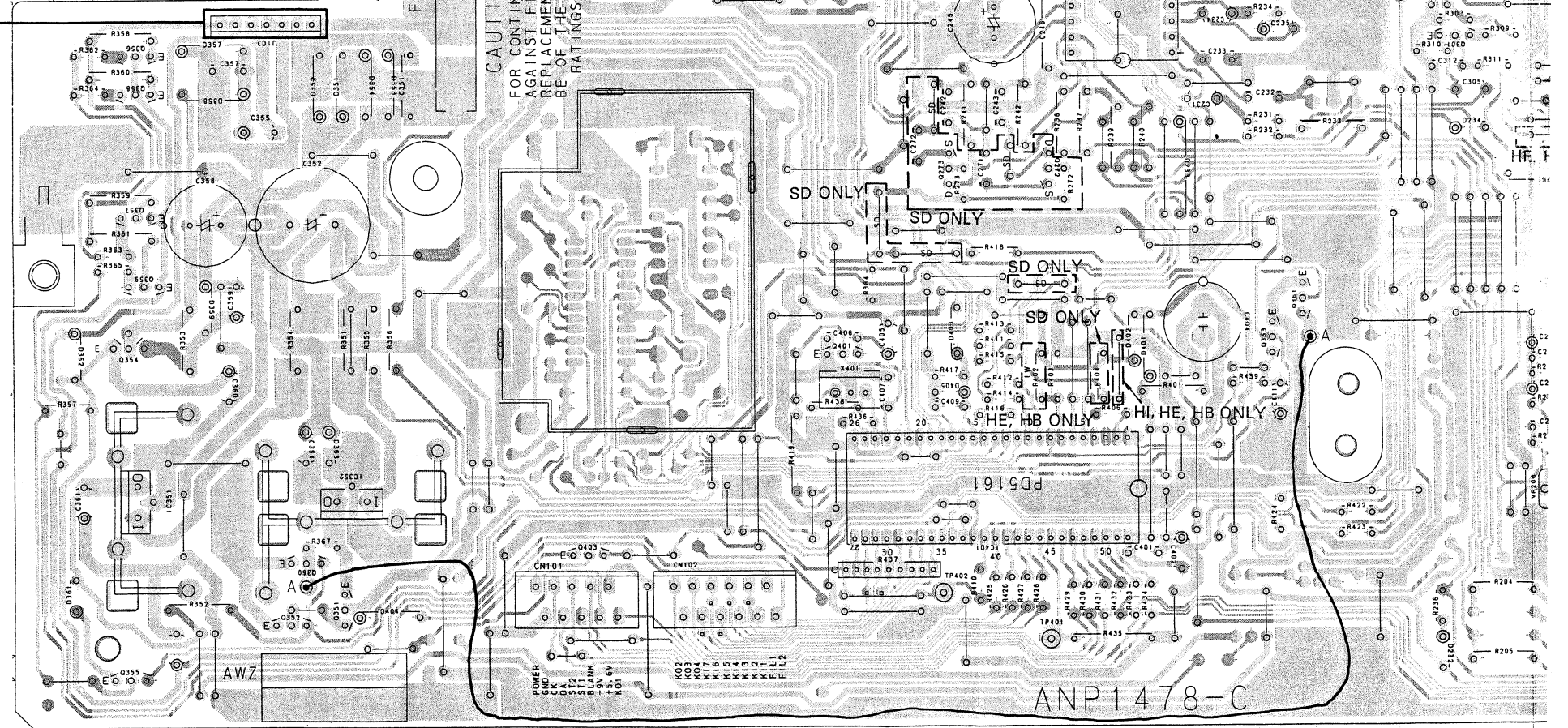
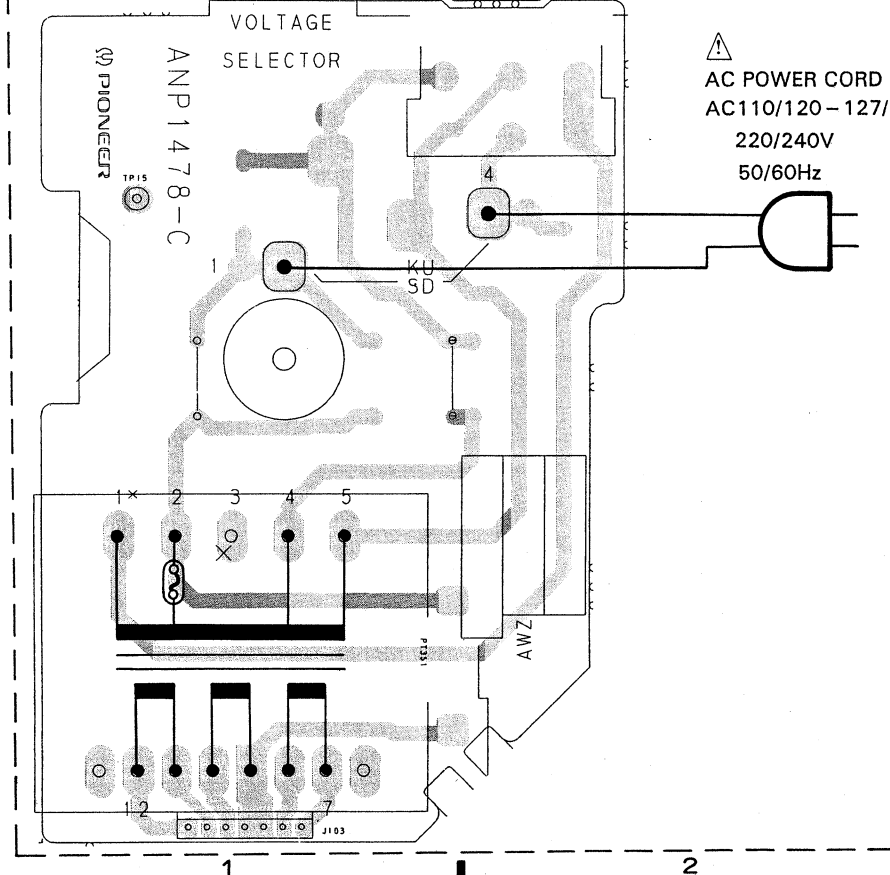
This P. C. B connection diagram is viewed from the parts mounted side.

**TUNER assembly (AWZ4173 : HE*, HB*)
(AWZ4170 : HI*)
(AWZ4171 : SD*)**



SD* ONLY

**POWER assembly
(AWZ4175 : SD*)**



Q356-Q359
Q355 Q354 IC351 Q352 Q360 Q351 IC352

Q381

Q403

Q401

Q273
IC401

Q272 IC231

Q353 Q361

VR232 VR231

VR301

Q104 IC301
Q301

VF

Q1

1. B connection diagram is viewed from the mounted side.

AC POWER CORD
AC 220-230V/240V
50/60Hz

HE* and F-401/HEWIX1K)

with the following steps.

TUNER assembly primary

on the rear panel.

Description
220V label
240V label

CAUTION
FOR CONTINUED PROTECTION
AGAINST FIRE HAZARD,
REPLACE FUSES WITH
FUSES OF THE SAME TYPE AND
RATINGS ONLY.

250V
T 400mA

POWER
CV
DA
S11
BLANK
+5.4V
K01

Q352 Q360 Q351 IC352

Q403

Q401

Q273 IC401

Q272 IC231

Q353 Q361

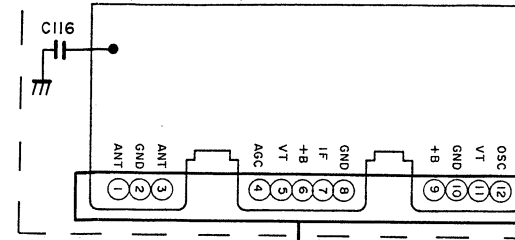
Q104 IC301 Q301

Q103 Q105 Q106 Q151-Q154 Q102 Q101
IC151 Q322 Q321 IC321
Q201

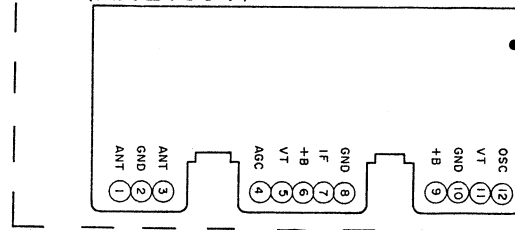
TUNER assembly (AWZ4173 : HE*, HB*)
(AWZ4170 : HI*)
(AWZ4171 : SD*)

AM FM (75Ω) FM (75Ω)

HE*, HB*, SD* ONLY
3 Serial F.E. module assembly
(AXQ1003)



HI* ONLY
4 Serial F.E. module assembly
(AXQ1004)



* Abbreviations in PCB diagram(s) indicate the following :

	F-401L/HEX1K F-401L/HBX1K	F-401/HEWIX1K	F-401/SD
HE, HB	○	—	—
HI	—	○	—
SD	—	—	○

○ : Applicable
— : Not applicable

NOTE

- This P.C.B connection diagram is viewed from the parts mounted side.
- The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
EO 0504	EO or EO	Transistor
Q215	Q215 or Q215	Radiator type transistor
D203	D203	Diode
R237	R237	Resistor
C513	C513	Capacitor (Polarized)
C518	C518	Capacitor (Non-polarized)

Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

- The capacitor terminal marked with ⊕ (double circles) shows negative terminal.
- The diode terminal marked with ⊕ (double circles) shows cathode side.
- The transistor terminal to which E is affixed shows the emitter.

3. PCB PARTS LIST

3.1 FOR F-401L/HEX1K AND HBX1K

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω \rightarrow 56 $\times 10^1$ \rightarrow 561 RD1/8PM Δ Δ Δ J

47k Ω \rightarrow 47 $\times 10^3$ \rightarrow 473 RD1/4PS Δ Δ Δ J

0.5 Ω \rightarrow 0R5 RN2H Δ Δ Δ K

1 Ω \rightarrow 010 RS1P Δ Δ Δ K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω \rightarrow 562 $\times 10^1$ \rightarrow 5621 RN1/4PC Δ Δ Δ Δ F

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
LIST OF ASSEMBLIES				Q361	TRANSISTOR	XDC124ES	
●		TUNER ASSEMBLY	AWZ4173	Q381	TRANSISTOR	2SC1740S	
●		POWER ASSEMBLY	AWZ4177	Q401	TRANSISTOR	XDC143ES	
●		DISPLAY ASSEMBLY	AWP1039	Q403	TRANSISTOR	XDA143ES	
TUNER ASSEMBLY				D101, 102	DIODE	1SS85	
SEMICONDUCTORS				D103-106	DIODE	1SS252	
IC151	AMPLIFIER IC	TA7060AP		D151-154	DIODE	1SS252	
IC201	FM IC	PA5008		D201	DIODE	1SS252	
IC231	MPX IC	PA5007		D232-234	DIODE	1SS252	
IC301	AM/FM IC	LA1265S		Δ D351-354	DIODE	S5566	
IC321	PLL IC	LM7001		Δ D357, 358	DIODE	S5566	
IC351	REGULATOR IC	NJM78M56FAS		D359	ZENER DIODE	RD10ESB	
IC352	REGULATOR IC	MC7812CT		D361	DIODE	1SS252	
IC401	TUNER CONTROL MICRO-COMPUTER	PD5161A		D362	ZENER DIODE	RD2.7ESB	
Q101	TRANSISTOR	XDA143ES		D363, 381	DIODE	1SS252	
Q102	TRANSISTOR	2SC1740S		D401-403	DIODE	1SS252	
Q103	TRANSISTOR	XDA143ES		D404	ZENER DIODE	RD6.2ESB2	
Q104	TRANSISTOR	XDC143ES		D405	ZENER DIODE	RD5.1ESB1	
Q105	TRANSISTOR	XDA143ES		COILS & TRANSFORMER			
Q106	TRANSISTOR	XDC143ES		F151	CERAMIC FILTER	ATF-119	
Q151, 152	TRANSISTOR	XDA143ES		F153	CERAMIC FILTER	ATF1079	
Q153, 154	TRANSISTOR	2SC2668		F155	CERAMIC FILTER	ATF-107	
Q201	N-FET	2SK246		F301	CERAMIC FILTER	ATF-208	
Q301	TRANSISTOR	2SC1740S		L231	COIL	ATM1003	
Q321	N-FET	2SK246		L321	AXIAL INDUCTOR	LAU2R2M	
Q322	TRANSISTOR	2SC1740SLN		T201	IF TRANSFORMER	ATE-068	
Q351	TRANSISTOR	2SA1529		CAPACITORS			
Q352, 353	TRANSISTOR	XDC143ES		C103	CERAMIC CAPACITOR	CKPUYY103M16	
Q354	TRANSISTOR	2SB560		C104	CERAMIC CAPACITOR	CKDYF473Z50	
Q355	TRANSISTOR	XDA143ES		C105, 106	CERAMIC CAPACITOR	CKDYF223Z50	
Q356-359	TRANSISTOR	2SC2878		C108, 109	CERAMIC CAPACITOR	CKDYX103M25	
Q360	TRANSISTOR	XDC124ES		C111	CERAMIC CAPACITOR	CKPUYB102K50	

Mark No.	Description	Parts No.
C116	CERAMIC CAPACITOR	CKDYX103M25
C151, 152	CERAMIC CAPACITOR	CKDYF223Z50
C153	CERAMIC CAPACITOR	CKDYX473M25
C154	CERAMIC CAPACITOR	CKPUYY103M16
C201	CERAMIC CAPACITOR	CCMCH150J50
C202	CERAMIC CAPACITOR	CCMCH330J50
C203	ELECT. CAPACITOR	CEAS010M50
C205	CERAMIC CAPACITOR	CKPUYY103M16
C206	ELECT. CAPACITOR	CEAS101M25
C207, 208	CERAMIC CAPACITOR	CKDYX473M25
C209	CERAMIC CAPACITOR	CKPUYY103M16
C210	ELECT. CAPACITOR	CEAS010M50
C211	CERAMIC CAPACITOR	CKPUYY103M16
C212	ELECT. CAPACITOR	CEAS010M50
C213, 214	CERAMIC CAPACITOR	CKMYB181K50
C215	ELECT. CAPACITOR	CEAS4R7M50
C216	CERAMIC CAPACITOR	CKPUYY103M16
C217	ELECT. CAPACITOR	CEAS101M25
C231	ELECT. CAPACITOR	CEAS220M50
C232	AUDIO FILM CAPACITOR	CFTXA473J50
C233	CERAMIC CAPACITOR	CKCYB152K50
C234	ELECT. CAPACITOR	CEAS1R5M50
C235	ELECT. CAPACITOR	CEAS100M50
C236	CKA (390P/50V)	ACG-023
C237	ELECT. CAPACITOR	CEAS6R8M50
C238, 239	ELECT. CAPACITOR	CEAS100M50
C240	PL.STYRENE CAPACITOR	CQSA682J50
C241	ELECT. CAPACITOR	CEAS220M50
C242, 243	MYLAR FILM CAPACITOR	CQMA152J50
C244	ELECT. CAPACITOR	CEAS470M25
C245	ELECT. CAPACITOR	CEAS471M10
C246, 247	CERAMIC CAPACITOR	CKPUYY103M16
C248	ELECT. CAPACITOR	CEAS471M16
C249, 250	ELECT. CAPACITOR	CEAS4R7M50
C251, 252	CERAMIC CAPACITOR	CKDYB472K50
C265, 266	ELECT. CAPACITOR	CEAS4R7M50
C301	CERAMIC CAPACITOR	CKPUYY103M16
C302	ELECT. CAPACITOR	CEAS330M35
C304	ELECT. CAPACITOR	CEAS100M50
C305	ELECT. CAPACITOR	CEANP4R7M50
C306	ELECT. CAPACITOR	CEAS4R7M50
C307	CERAMIC CAPACITOR	CKCYB222K50
C308	CERAMIC CAPACITOR	CKDYX473M25
C309	CERAMIC CAPACITOR	CKDYF223Z50
C310	CERAMIC CAPACITOR	CKPUYY103M16
C311	ELECT. CAPACITOR	CEAS470M25
C312	CERAMIC CAPACITOR	CKPUYY103M16
C313	CERAMIC CAPACITOR	CKDYF223Z50
C314	CERAMIC CAPACITOR	CKPUYY103M16
C315	CERAMIC CAPACITOR	CKDYF223Z50
C321, 322	CERAMIC CAPACITOR	CCMCH150J50
C323-325	AXIAL CAPACITOR	CCPUSL470J50

Mark No.	Description	Parts No.
C326, 327	CERAMIC CAPACITOR	CKPUYY103M16
C328	AXIAL CAPACITOR	CCPUSL470J50
C329	ELECT. CAPACITOR	CEAS330M35
C330	AUDIO FILM CAPACITOR	CFTXA224J50
C331	CERAMIC CAPACITOR	CKPUYY103M16
△ C351	CAPACITOR (CERAMIC)	ACG-009
C352	ELECT. CAPACITOR	CEAS222M35
C354	ELECT. CAPACITOR	CEAS330M35
C355	ELECT. CAPACITOR	CEAS221M10
C357	CERAMIC CAPACITOR	CKDYF473Z50
C358	ELECT. CAPACITOR	CEAS471M25
C359	ELECT. CAPACITOR	CEAS470M25
C360	ELECT. CAPACITOR	CEAS101M25
C361	ELECT. CAPACITOR	CEAS470M25
C381	CERAMIC CAPACITOR	CKPUYB101K50
C401	CERAMIC CAPACITOR	CKPUYY103M16
C402	ELECT. CAPACITOR	CEAS221M10
C404	CAPACITOR	ACH1135
C405	ELECT. CAPACITOR	CEAS100M50
C406, 407	CERAMIC CAPACITOR	CKPUYB101K50
C409	CERAMIC CAPACITOR	CKPUYB101K50
RESISTORS		
VR201, 202	VR (4.7kΩ)	ACPI042
VR204	VR (10kΩ)	ACPI043
VR205	VR (100kΩ)	ACPI046
VR206	VR (220Ω)	ACPI038
VR231	VR	VRTS6VS222
VR232	VR (22kΩ)	ACPI044
VR301	VR (10kΩ)	ACPI043
R102	CARBON FILM RESISTOR	RD1/4PM472J
R235	METALFILM RESISTER	RN1/4PC5601F
R237, 238	CARBON FILM RESISTOR	RDR1/4PM223J
R241, 242	CARBON FILM RESISTOR	RDR1/4PM333J
R243, 244	CARBON FILM RESISTOR	RDR1/4PM332J
R245, 246	CARBON FILM RESISTOR	RDR1/4PM223J
R247, 248	CARBON FILM RESISTOR	RDR1/4PM102J
R249, 250	CARBON FILM RESISTOR	RDR1/4PM821J
R251, 252	CARBON FILM RESISTOR	RDR1/4PM152J
R351	CARBON FILM RESISTOR	RD1/2PM4R7J
R353	CARBON FILM RESISTOR	RD1/2PM471J
△ R354	FUSIBLE RESISTOR	RFA1/4PS180J
R355	CARBON FILM RESISTOR	RD1/2PM222J

Mark No.	Description	Parts No.
R358-361	CARBON FILM RESISTOR	RD1/4PM010J
R437	RESISTOR ARRAY (22K)	RA8T223J
	Other resistors	RD1/8PM□□□J

OTHERS

TH201	THERMISTOR	TH103-2
CN101	CONNECTOR (10P)	KPE10
CN102	CONNECTOR (12P)	KPE12

X301	CERAMIC RESONATOR (450kHz)	ATF1027
X321	CRYSTAL RESONATOR (7.2MHz)	ASS1005
X401	CERAMIC RESONATOR (7.7MHz)	ASS1055

SCREW	ABA-298
ANTENNA TERMINAL 4-P WITH PAL	AKA1010
PIN JACK 2P	AKB1039
JACK	AKN-207
AM RF TUNING BLOCK	AXX1012
AM RF TUNING BLOCK	AXX1013
3 SERIAL F.E. MODULE ASSEMBLY	AXQ1003

NOTE :

3. Serial F.E. module assembly has no service parts.

POWER ASSEMBLY

TRANSFORMER

△ T351	POWER TRANSFORMER	ATT1155
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DISPLAY ASSEMBLY

Although DISPLAY assembly (AWP1036) and DISPLAY assembly (AWP1039) are different in part number, they have the same service parts.

3.2 FOR F-401/HEWIX1K AND SD

NOTES:

- Parts marked by "NSP" are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

TUNER ASSEMBLY

TUNER assembly (AWZ4170, AWZ4171) and TUNER assembly (AWZ4173) have the same construction except for the following :

Mark	Symbol & Description	Part No.			Remarks
		AWZ4173	AWZ4170	AWZ4171	
	Q104, Q106	XDC143ES	.....	.....
	Q105	XDA143ES	.....	.....
	Q272, Q273	.....	.....	2SK246	
	D101, D102	1SS85	.....	.....
	D103-D106	1SS252	.....	.....
	D108	.....	1SV156	.....
	S381 9k/10k selector	.....	.....	ASH1015	
	L101	.....	LAU2R2M	.....
	L232	.....	LAU010M	.....
	L233, L234	.....	LAU100K	.....
	TC101	.....	ACM-018	.....
	C101, C110, C112, C253	.....	CKDYX103M25	.....
	C102	.....	CKPUYY103M16	.....
	C105	CKDYF223Z50	.....	.....
	C116	CKDYX103M25	.....	CKDYX103M25	
	C271, C272	.....	.....	CKCYB681K50	
	C352	CEAS222M35	CEAS222M35	CEAS222M50	
	R101	.....	RD1/8PM153J	.....
	R102	RD1/4PM472J	RD1/2PM751J	RD1/4PM472J	
	R103	.....	RD1/8PM330J	.....
	R106, R109, 308	RD1/8PM681J	.....	.....
	R107	RD1/8PM104J	.....	.....
	R108, R402	RD1/8PM102J	.....	.....
	R114	RD1/8PM103J	.....	RD1/8PM103J	
	R115	RD1/8PM103J	.....	.....
	R177	RD1/8PM331J	RD1/8PM221J	RD1/8PM331J	
	R272, R273	.....	.....	RD1/8PM105J	
	R404	.....	.....	RD1/8PM473J	
	Antenna terminal 4P	.....	.....	AKA1009	
	Antenna terminal 4P with PAL	AKA1010	.....	.....
	Antenna terminal 2P with PAL	.....	AKA1012	.....

Mark	Symbol & Description	Part No.			Remarks
		AWZ4173	AWZ4170	AWZ4171	
	3 Serial F.E. module assembly	AXQ1003	.....	AXQ1003	*1
	4 Serial F.E. module assembly	.....	AXQ1004	.....	*1
	AM RF Tuning block	AXX1012	AXX1014	AXX1011	
	AM RF Tuning block	AXX1013	.....	.....

*1 All of these assemblies has no service parts.

POWER ASSEMBLY

POWER assembly (AWZ4174, AWZ4175) and POWER assembly (AWZ4177) have the same construction except for the following :

Mark	Symbol & Description	Part No.			Remarks
		AWZ4177	AWZ4174	AWZ4175	
△	S351 Voltage selector (AC110V/120-127V/220V/240V)	.....	.....	AKX-505	
△	L351	.....	ATF-163	.....
△	C353	.....	ACG1002	.....

4. ADJUSTMENTS

4.1 FM TUNER ADJUSTMENTS

- Connect as shown in the Fig. 4-1.

4.1.1 FM MONO

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	T-meter adjustment	98MHz	MONO	60dB μ V	98MHz NORMAL	T201-B	Adjust so that the voltage between TP2 and TP3 becomes 0±100mV.
2	MONO distortion adjustment	98MHz	MONO	60dB μ V	98MHz NORMAL	T201-A	Adjust so that the distortion becomes minimum.
3	Sub-balance adjustment	98MHz	MONO	60dB μ V	98MHz NORMAL	VR206	Adjust so that the AC voltage at IC201 pin2 (TP5) becomes minimum.

4.1.2 FM STEREO

Stereo modulation : Main 1kHz L+R ±68.25kHz, Pilot 19kHz±6.75kHz

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	VCO adjustment	108MHz	OFF	60dB μ V	108MHz	VR231	Adjust so that the output at TP7 becomes 38kHz ±100Hz.
2	Pilot cancel	107MHz	PILOT ONLY	60dB μ V	107MHz NORMAL	VR232	Adjust so that the AC voltage at output terminal becomes minimum. (MAX LPF : OFF)
3	Separation adjustment	89MHz	R-ONLY	60dB μ V	89MHz NORMAL	VR202	Adjust so that the separation R → L becomes maximum.
4			L-ONLY	60dB μ V	89MHz NORMAL	VR201	Adjust so that the separation L → R becomes maximum.
5	Stereo distortion adjustment *1	89MHz	L-ONLY	60dB μ V	89MHz	Front End IFT T101	Minimize the distortion within 1/4 rotation of the core, and check conformity to the specification.

*1 : F-401L/HEX1K, HBX1K and F-401/SD only

4.1.3 FM ETC

Step	Adjustment name	FM SG (1kHz±75kHz dev.)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	S-meter adjustment	99MHz	MONO	75dB μ V	99MHz NORMAL	VR205	Adjust so that the voltage between TP4 and GND becomes 4.9V ±0.05 V.
2	Muting level adjustment	99MHz	MONO	12dB μ V	99MHz NORMAL	VR204	Adjust so that the muting is released at the input level shown on the left.

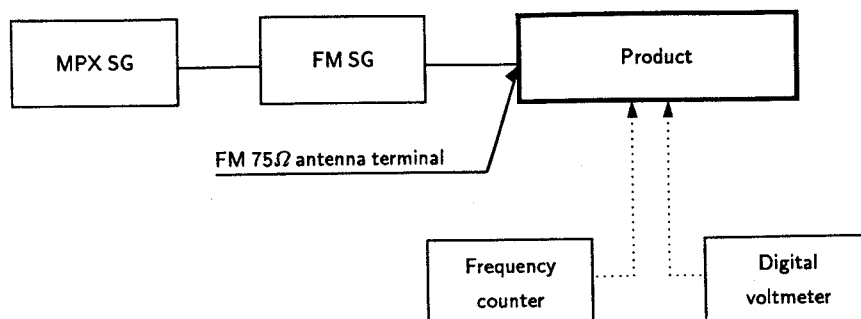


Fig. 4-1 FM Adjustment Connection Diagram

4.2 AM TUNER ADJUSTMENTS

- Connect as shown in the Fig. 4-2.

Step	Adjustment name	AM SG (400Hz 30% modulation)			FL display IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	Tracking adjustment *1	603kHz	OFF	Low input level	603kHz	ANT. coil of MW block (AXX1014)	Adjust so that the voltage between TP9 and GND becomes maximum.
		1395kHz	OFF	Low input level	1395kHz	TC101	
2	IFT adjustment *1	603kHz	OFF	Low input level	603kHz	F301	
3	S-meter adjustment	1008kHz	ON	74dB μ V/m	1008kHz	VR301	Adjust so that the voltage between TP9 and GND becomes 2.5 \pm 0.05V.

*1 : For F-401/HEWIX1K only

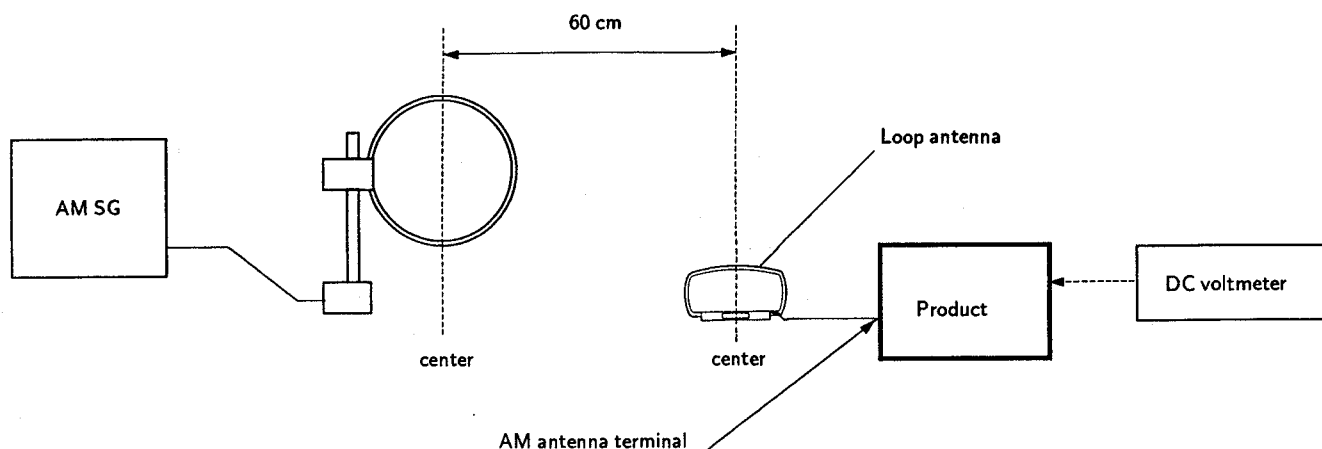


Fig. 4-2 MW Adjustment Connection Diagram

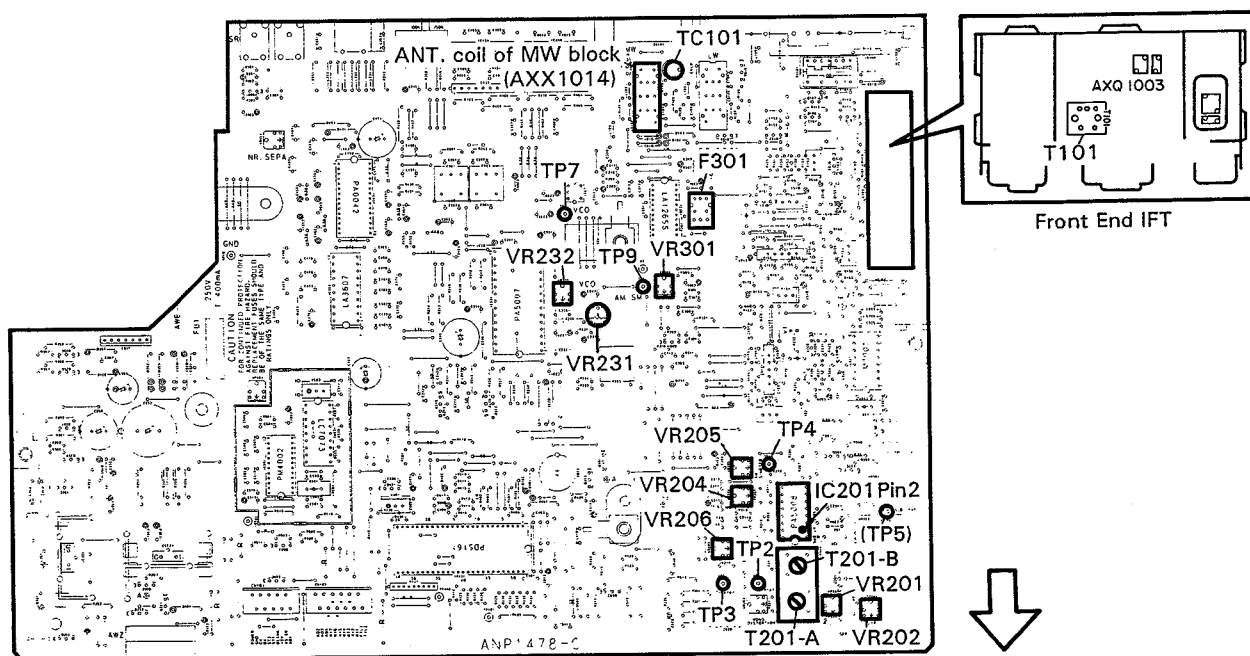


Fig. 4-3 Adjustment Points

4. REGLAGES

4.1 REGLAGES DU SYNTONISEUR FM

● Raccorder comme indiqué à la Fig. 4-1.

4.1.1 MONO FM

Etape	Nom du réglage	FM SG (1kHz ± 75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en T	98MHz	MONO	60dBµV	98MHz NORMAL	T201-B	Régler afin que la tension entre TP2 et TP3 soit de 0 ± 100mV.
2	Réglage de distorsion MONO	98MHz	MONO	60dBµV	98MHz NORMAL	T201-A	Régler afin que la distorsion soit minimale.
3	Réglage de l'équilibre auxiliaire	98MHz	MONO	60dBµV	98MHz NORMAL	VR206	Régler afin que la tension CA à IC201 Broche 2 (TP5) soit minimale.

4.1.2 STEREO FM

Modulation de Stéréo : Principale 1kHz L+R ± 68,25kHz. Pilote 19kHz ± 6,75kHz

Etape	Nom du réglage	FM SG (1kHz ± 75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage du VCO	108MHz	OFF	60dBµV	108MHz	VR231	Régler afin que la sortie à TP7 soit de 38kHz ± 100Hz.
2	Neutralisation pilote	107MHz	PILOT ONLY	60dBµV	107MHz NORMAL	VR232	Régler afin que la tension CA, bornes de sortie, soit minimale. (MAX LPF : HORS CIRCUIT)
3	Réglage du séparation	89MHz	R-ONLY	60dBµV	89MHz NORMAL	VR202	Régler afin que la séparation D → G soit maximale.
4			L-ONLY	60dBµV	89MHz NORMAL	VR201	Régler afin que la séparation D → G soit maximale.
5	Réglage de distorsion stéréo *1	89MHz	L-ONLY	60dBµV	89MHz	Extrémité avant IFT T101	Minimiser la distorsion à 1/4 de rotation du noyau et vérifier qu'il y a conformité aux spécifications.

*1 : F-401L/HEX1K, HBX1K et F-401/SD seulement

4.1.3 ETC FM

Etape	Nom du réglage	FM SG (1kHz ± 75kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en S	99MHz	MONO	75dBµV	99MHz NORMAL	VR205	Régler afin que la tension entre TP4 en GND soit de 4,9V ± 0,1 V.
2	Réglage de niveau de sourdine	99MHz	MONO	12dBµV	99MHz NORMAL	VR204	Régler afin que la sourdine soit relâchée au niveau d'entrée indiqué sur la gauche.

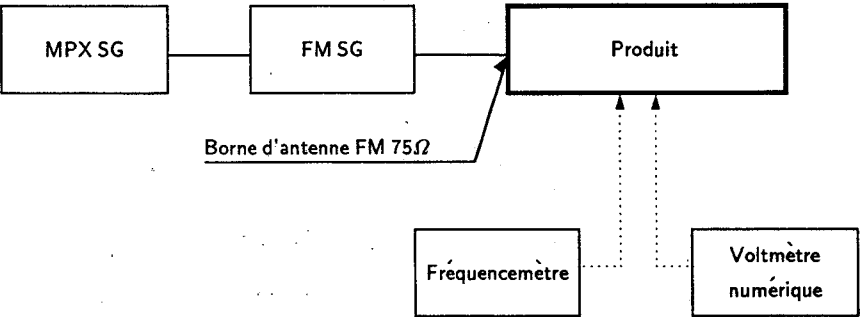


Fig. 4-1 Schéma de connexion de réglage FM

4.2 REGLAGES DU SYNTONISEUR AM

- Raccorder comme indiqué à la Fig. 4-2.

Etape	Nom du réglage	AM SG (400Hz 30% modulation)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage d'alignement *1	603kHz	OFF	Niveau bas d'entrée	603kHz	Bobine ANT du bloc MW (AXX1014)	Régler afin que la tension entre TP9 et GND soit maximale.
		1395kHz	OFF	Niveau bas d'entrée	1395kHz	TC101	
2	Réglage du transformateur de FI *1	603kHz	OFF	Niveau bas d'entrée	603kHz	F301	
3	Appareil de mesure en S	1008kHz	ON	74dBμV/m	1008kHz	VR301	Régler afin que la tension entre TP9 et GND soit 2,5 ±0,05V.

*1 : Réglage pour F-401/HEWIX1K seulement

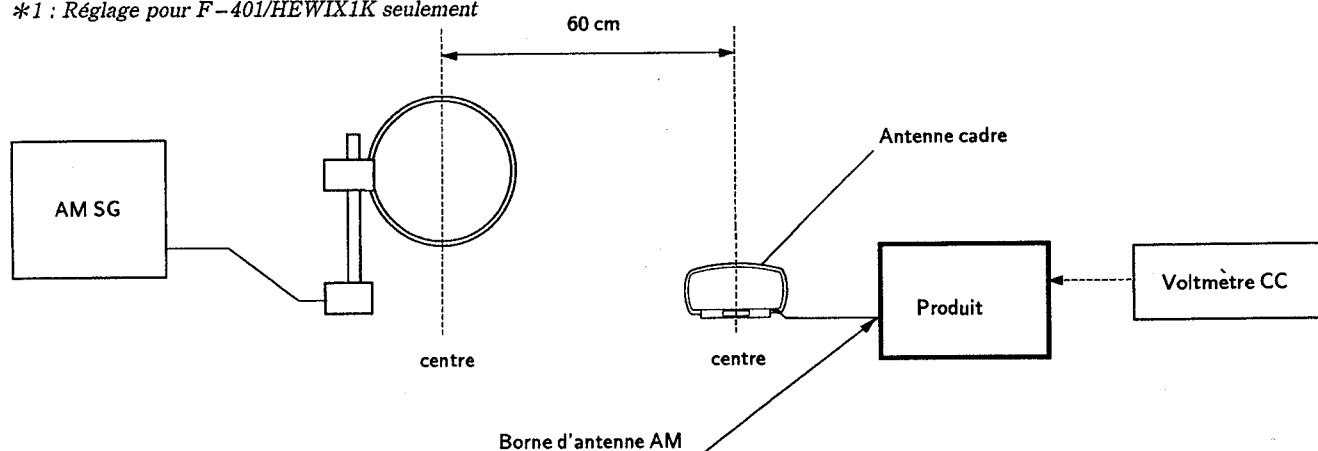


Fig. 4-2 Schéma de connexion de réglage AM

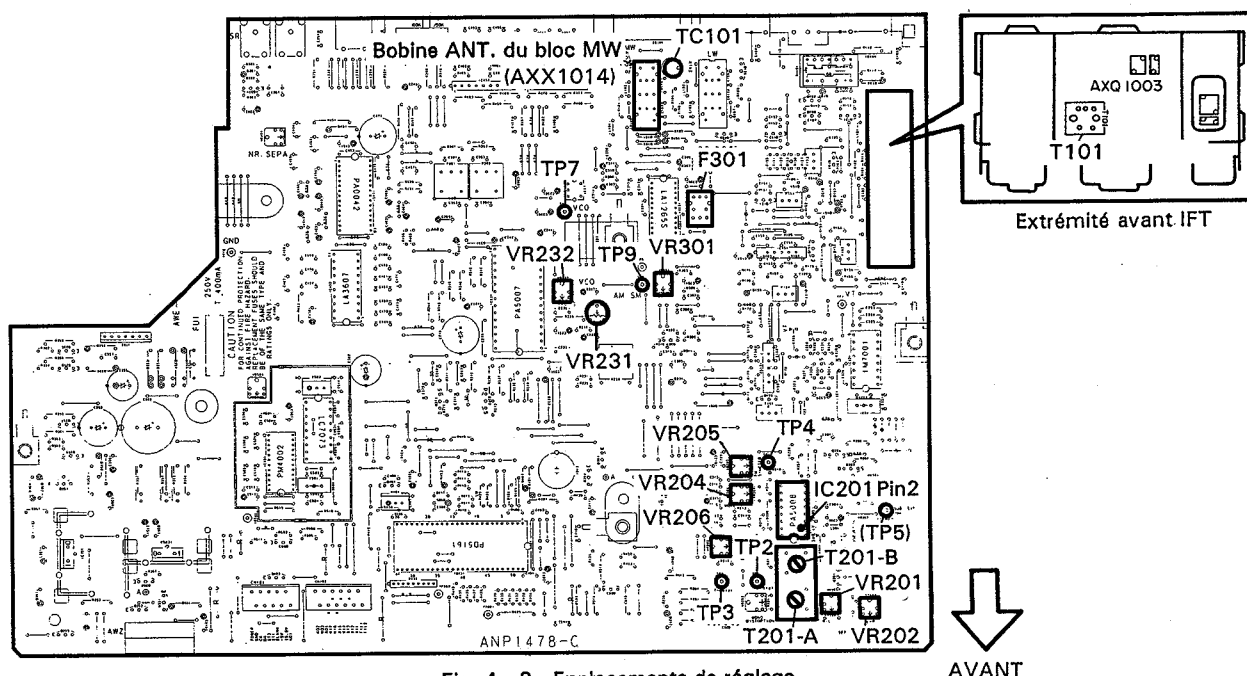


Fig. 4-3 Enplacements de réglage

4. AJUSTES

4.1 AJUSTES DEL SINTONIZADOR DE FM

● Conecte como indica la Fig. 4-1.

4.1.1 FM MONO

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor T	98MHz	MONO	60dBμV	98MHz NORMAL	T201-B	Ajuste de modo que la tensión entre TP2 y TP3 sea 0±100mV.
2	Ajuste de la distorsión monofónica	98MHz	MONO	60dBμV	98MHz NORMAL	T201-A	Ajuste de modo que la distorsión sea mínima.
3	Ajuste del subbalance	98MHz	MONO	60dBμV	98MHz NORMAL	VR206	Ajuste de modo que la tensión de CA en IC201 Patilla 2 (TP5) sea mínima.

4.1.2 FM STEREO

Modulación de estéreo : Principal 1kHz L+R ±68,25kHz. Piloto 19kHz±6,75kHz

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del VCO	108MHz	OFF	60dBμV	108MHz	VR231	Ajuste de modo que la salida en TP7 sea 38kHz ±100Hz.
2	Cancelación del piloto	107MHz	PILOT ONLY	60dBμV	107MHz NORMAL	VR232	Ajuste de modo que la tensión de, terminales de salida, CA sea mínima. (MAX LPF : OFF)
3	Ajuste de la separación	89MHz	R-ONLY	60dBμV	89MHz NORMAL	VR202	Ajuste de modo que la separación R → L sea máxima.
4			L-ONLY	60dBμV	89MHz NORMAL	VR201	Ajuste de modo que la separación L → R sea máxima.
5	Ajuste de la distorsión estéreo *1	89MHz	L-ONLY	60dBμV	89MHz	Paso de guía IFT T101	Minimice la distorsión dentro de ratación de 1/4 del núcleo, y compruebe la conformidad con la especificación.

*1 : Solo F-401L/HEX1K, HBX1K y F-401/SD

4.1.3 FM ETC

Paso	Ajuste	FM SG (1kHz±75kHz dev.)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor S	99MHz	MONO	75dBμV	99MHz NORMAL	VR205	Ajuste de modo que la tensión entre TP4 y masa sea 4,9V ^{+0,05} _{-0,1} V.
2	Ajuste del nivel silenciador	99MHz	MONO	12dBμV	99MHz NORMAL	VR204	Ajuste de modo que el silenciamiento se desconecte en el nivel de entrada mostrado a la izquierda.

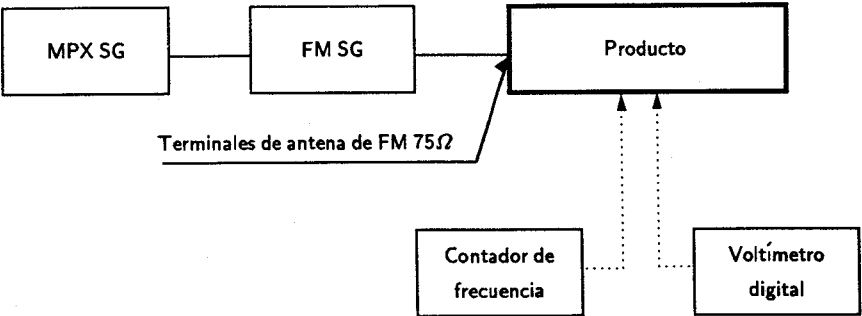


Fig. 4-1 Diagrama de conexiones para el ajuste de FM

4.2 AJUSTES DEL SINTONIZADOR DE AM

- Conecte como indica la Fig. 4-2.

Paso	Ajuste	AM SG (400Hz 30% modulation)			Visualización fluorescente, banda de FI, etc	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del seguimiento *1	603kHz	OFF	Nivel de entrada bajo	603kHz	Bobina de antena del bloque de MW (AXX1014)	Ajuste de modo que la tensión entre TP9 y masa sea máxima.
		1395kHz	OFF	Nivel de entrada bajo	1395kHz	TC101	
2	Ajuste del IFT *1	603kHz	OFF	Nivel de entrada bajo	603kHz	F301	Ajuste de modo que la tensión entre TP9 y masa sea 2,5 ± 0,05V.
3	Ajuste del medidor S	1008kHz	ON	74dB μ V/m	1008kHz	VR301	

*1 : Ajuste solo para F-401/HEWIX1K

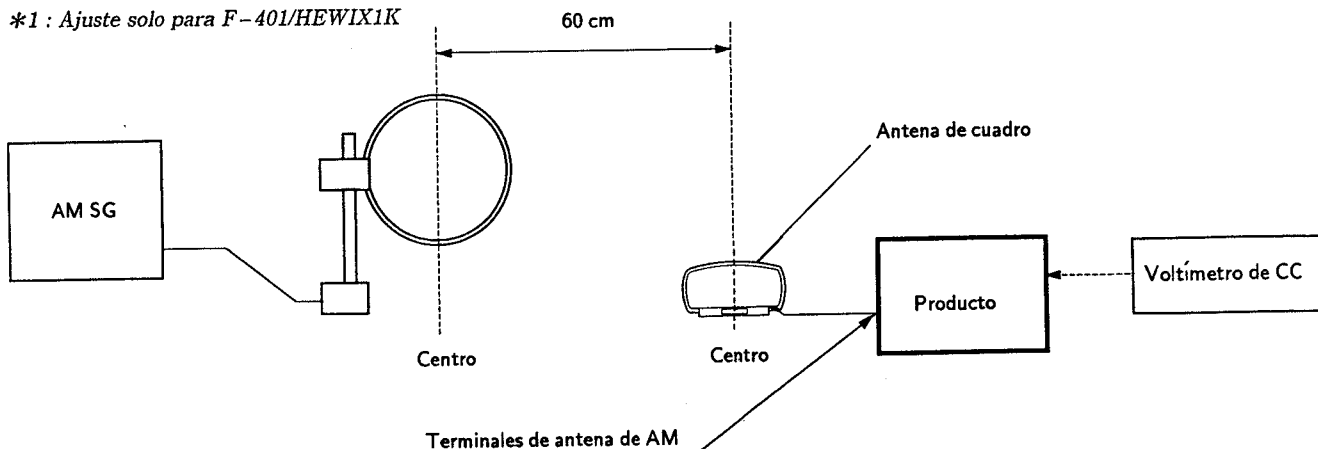


Fig. 4-2 Diagrama de conexiones para el ajuste de AM

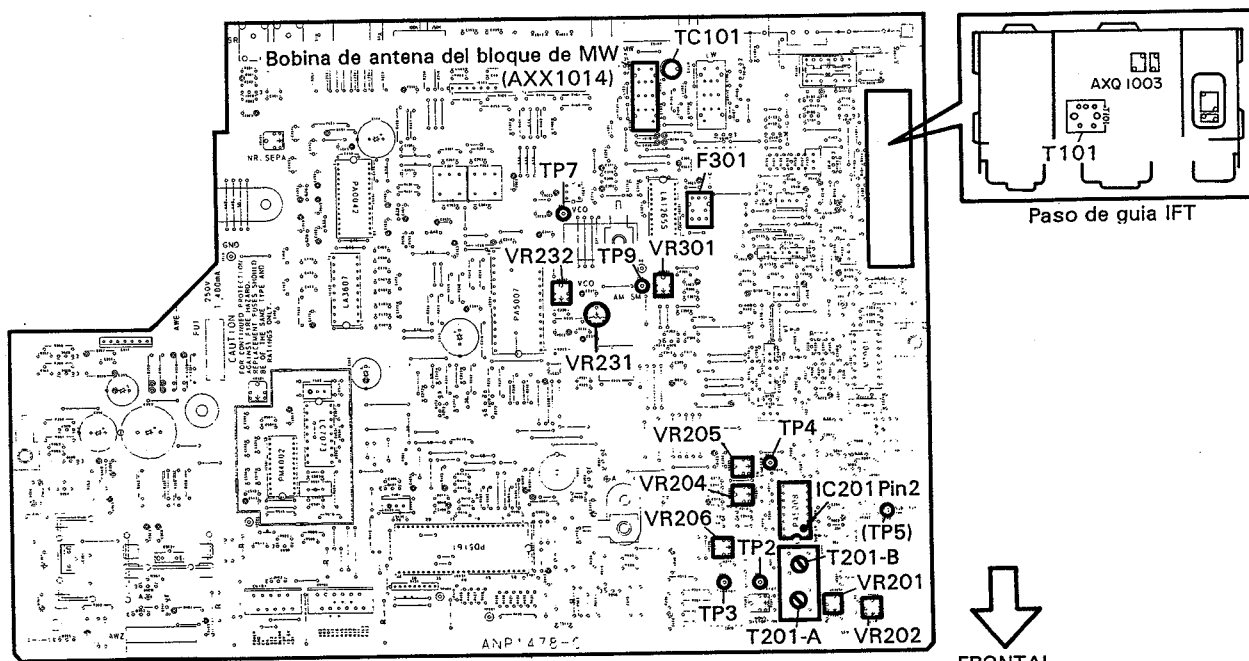
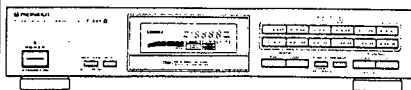


Fig. 4-3 Puntos de ajuste

Service Manual

PIONEER
The Art of Entertainment



ORDER NO.
ARP2243

FM/AM DIGITAL SYNTHESIZER TUNER

F-449

F-449-S

F-449L

F-449, F-449-S AND F-449L HAVE THE FOLLOWING:

Type	Model			Power Requirement	Remarks
	F-449	F-449-S	F-449L		
HEWZ	○	○	—	AC220V-230V, 240V (switchable) *	
HE	—	—	○	AC220V-230V, 240V (switchable) *	
HB	—	—	○	AC220V-230V, 240V (switchable) *	
HIX1B	○	—	—	AC220V-230V, 240V (switchable) *	
HEWX1B	—	—	○	AC220V-230V, 240V (switchable) *	
KU	○	—	—	AC120V only	
SD	○	—	—	AC110V, 120-127V, 220V, 240V (switchable)	

* Change the primary wiring of the power transformer.

- This manual is applicable to the F-449/HEWZ, F-449-S/HEWZ, F-449L/HE and HB types.
- As to the F-449-S/HEWZ, F-449L/HE and HB types, refer to page 30.
- As to the other types, refer to applicable service manuals.
- The F-449-S is the same as the F-449 except for color.
- The F-449L covers MW/LW bands while the F-449 covers MW only.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

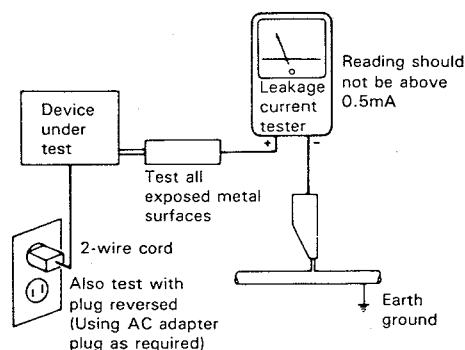
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

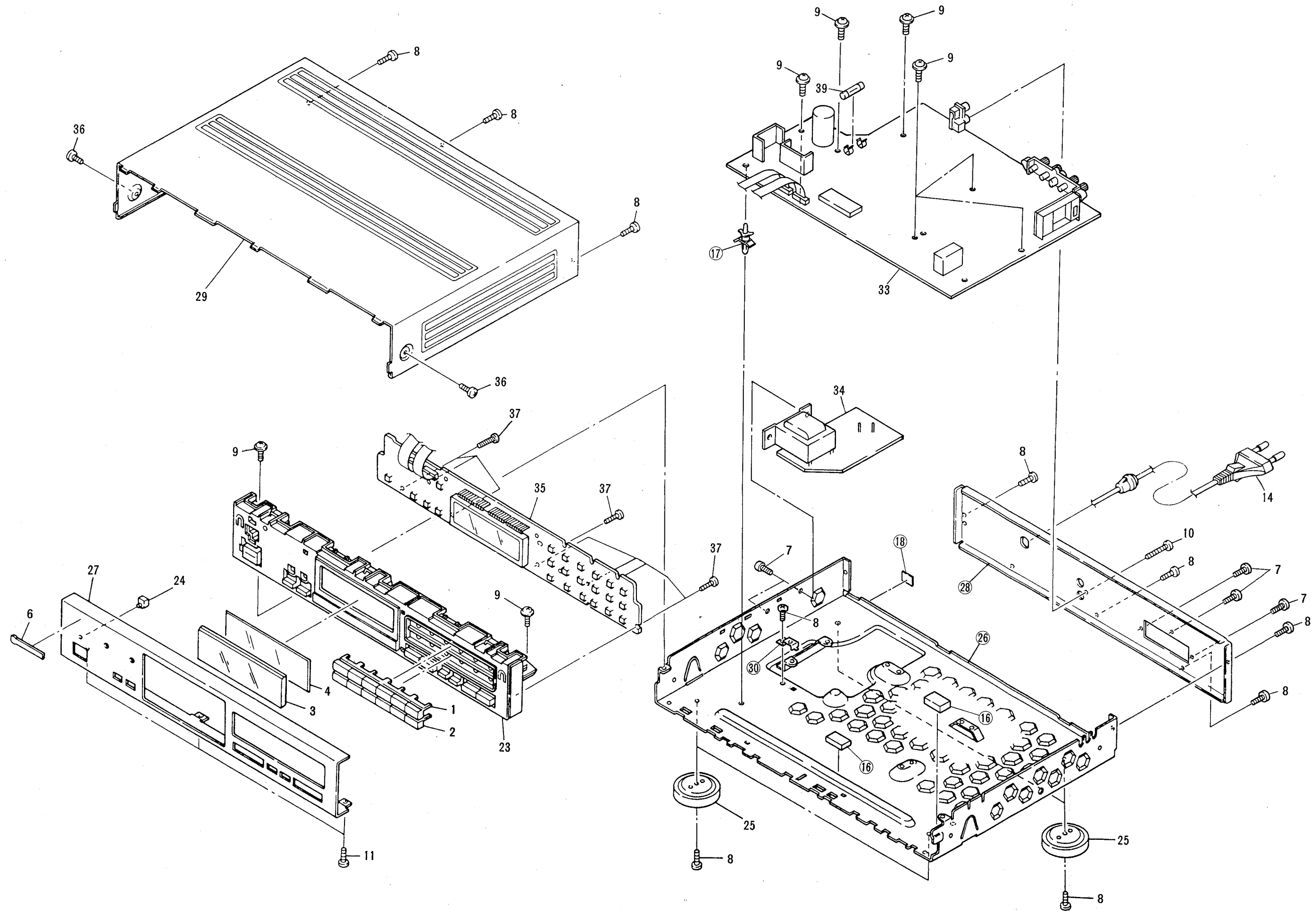
Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

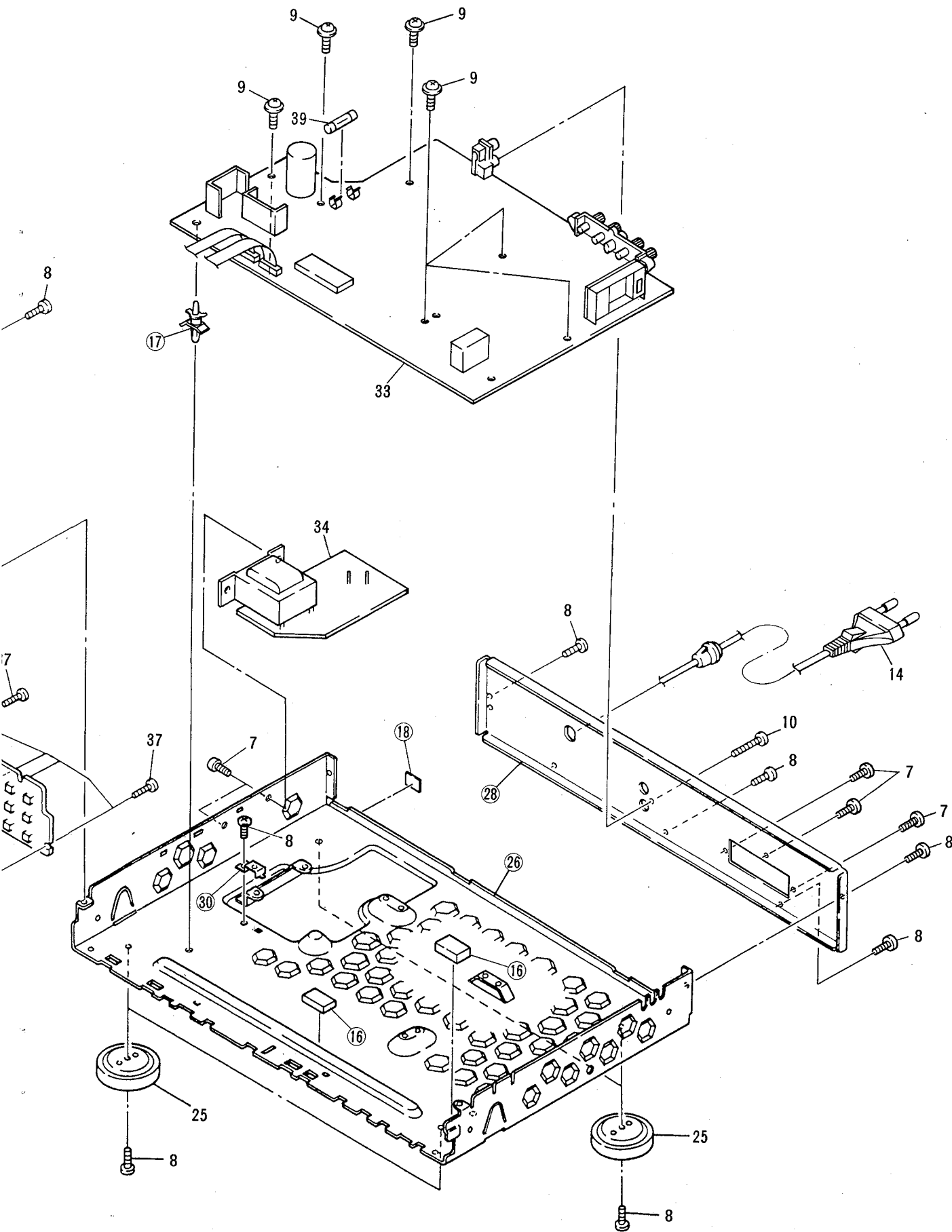
Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. EXPLODED VIEWS, PACKING AND PARTS LIST





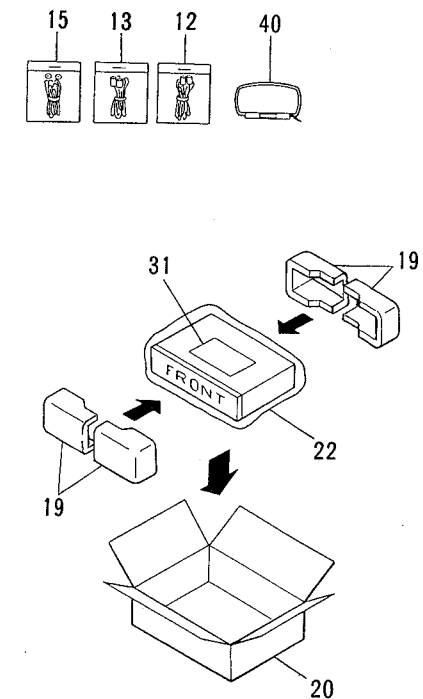
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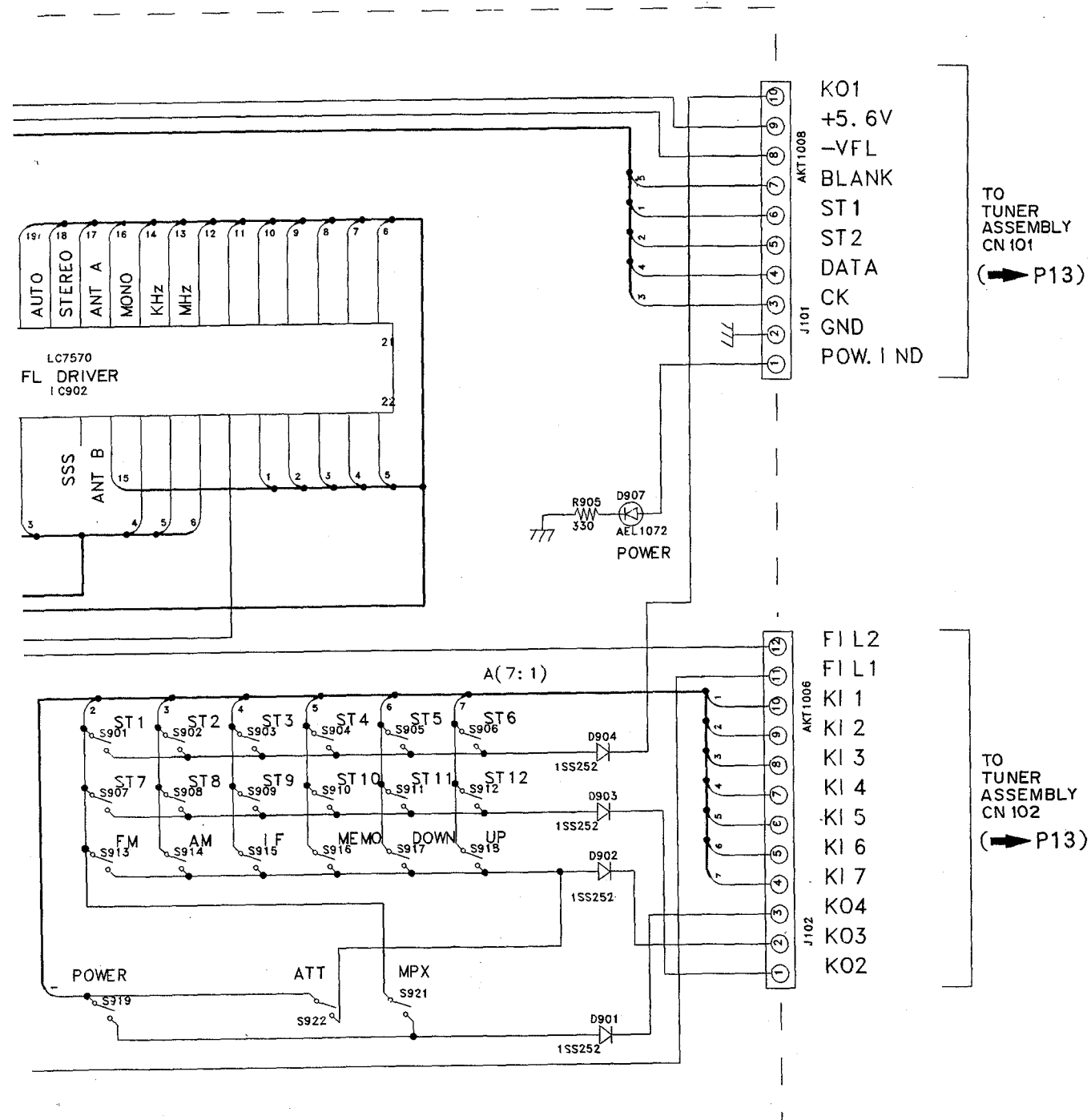
- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

Mark	No.	Description	Part No.
	1	STATION BUTTON(ABS)	AAD1751
		(1/13/25 - 6/18/30)	
	2	STATION BUTTON(ABS)	AAD1752
		(7/19/31 - 12/24/36)	
	3	PANEL	AAK1685
	4	FL FILTER	AAK1785
	5	.....
	6	NAME PLATE (METAL)	AAM1029
	7	SCREW	ABA - 298
	8	SCREW (STEEL)	ABA1009
	9	SCREW (STEEL)	ABA1011
	10	SCREW (STEEL)	ABA1047
	11	SCREW (STEEL)	ABA1048
	12	PLUG CORD	ADE - 044
	13	CORD WITH PLUG	ADE - 085
	14	AC POWER CORD	ADG1021
	15	FM ANTENNA	ADH1002
	16	CUSHION (RUBBER)	
	17	PCB SUPPORT	
	18	SPACER	
	19	FRONT REAR PAD	AHA1095
	20	PACKING CASE	AHD2056
	21	.....
	22	PACKING SHEET	AHG1017
	23	PANEL BASE	AMB1842
	24	INDICATING LENS	AMR1160
	25	INSULATOR ASSY	AMR2140
	26	CHASSIS ASSY	
	27	FRONT PANEL	ANB1451
	28	REAR PANEL	
	29	BONNET	AZN1745
	30	PCB HOLDER	
	31	OPERATING INSTRUCTIONS (GERMAN)	ARC1264
	32	.....
⊙	33	TUNER ASSEMBLY	AWZ3643
⊙	34	POWER ASSEMBLY	AWZ3649
	35	DISPLAY ASSEMBLY	AWP1036
	36	SCREW	BBT30P060FZK
	37	SCREW	BPZ26P080FMC
	38	.....
	39	FU101 FUSE (T400MA)	AEK - 504
	40	L1 LOOP ANTENNA	ATB1006

Packing





- RESISTORS:**
Indicated in Ω , 1/4W, 1/8W, $\pm 5\%$ tolerance unless otherwise noted k; k Ω , M; M Ω , (F); $\pm 1\%$, (G); $\pm 2\%$, (K); $\pm 10\%$, (M); $\pm 20\%$ tolerance.
- CAPACITORS:**
Indicated in capacity (μ F)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
- VOLTAGE CURRENT:**
mA: DC current at no input signal.
mV: Signal voltage at FM 400Hz ± 75 Hz DEV.
• The table in the margin shows the DC voltage at no signal.

- OTHERS:**
→: Signal route.
⊙: Adjusting point.
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

- SWITCHES (Underline indicates switch position)**
DISPLAY ASSEMBLY
S901: ST1
S902: ST2
S903: ST3
S904: ST4
S905: ST5
S906: ST6
S907: ST7
S908: ST8
S909: ST9
S910: ST10
S911: ST11
S912: ST12
S913: FM
S914: AM
S915: IF
S916: MEMO
S917: DOWN
S918: UP
S919: POWER
S921: MPX MODE
S922: RF ATT

IC151
(TA7060AP)

Pin No.	Volts
1	1.45
2	1.45
3	0
4	9.14
5	11.3

IC201
(PA5008)

Pin No.	Volts
1	6.43
2	6.49
3	6.32
4	12.5
5	0
6	3.48
7	3.48
8	3.49
9	2.92
10	6.35
11	0
12	6.44
13	6.4
14	2.27
15	6.42
16	6.42

IC231
(PA5007)

Pin No.	Volts	Pin No.	Volts
1	6.96	16	12.5
2	3.08	17	0
3	3.07	18	0
4	3.07	19	6.23
5	1.43	20	6.23
6	5.34	21	6.23
7	3.09	22	6.23
8	3.09	23	6.2
9	0	24	6.2
10	6.99	25	6.21
11	9.16	26	6.22
12	8.84	27	5.51
13	22.7	28	5.44
14	5.28	29	6.22
15	6.3	30	6.22

IC301
(LA1265S)

Pin No.	Volts	Pin No.	Volts
1	2.31	12	1.47
2	2.31	13	0.6
3	2.31	14	0.9
4	0	15	2.31
5	12.4	16	1.4
6	12.4	17	0
7	12.5	18	0
8	12.4	19	0
9	12.2	20	0.6
10	2.28	21	3.87
11	1.54	22	2.7

IC321
(LM7001)

Pin No.	Volts
1	1.25
2	1.52
3	0
4	0.8
5	1.15
6	0
7	12.4
8	12.4
9	0
10	0
11	2.65
12	5.6
13	5.6
14	0.8
15	0.8
16	0

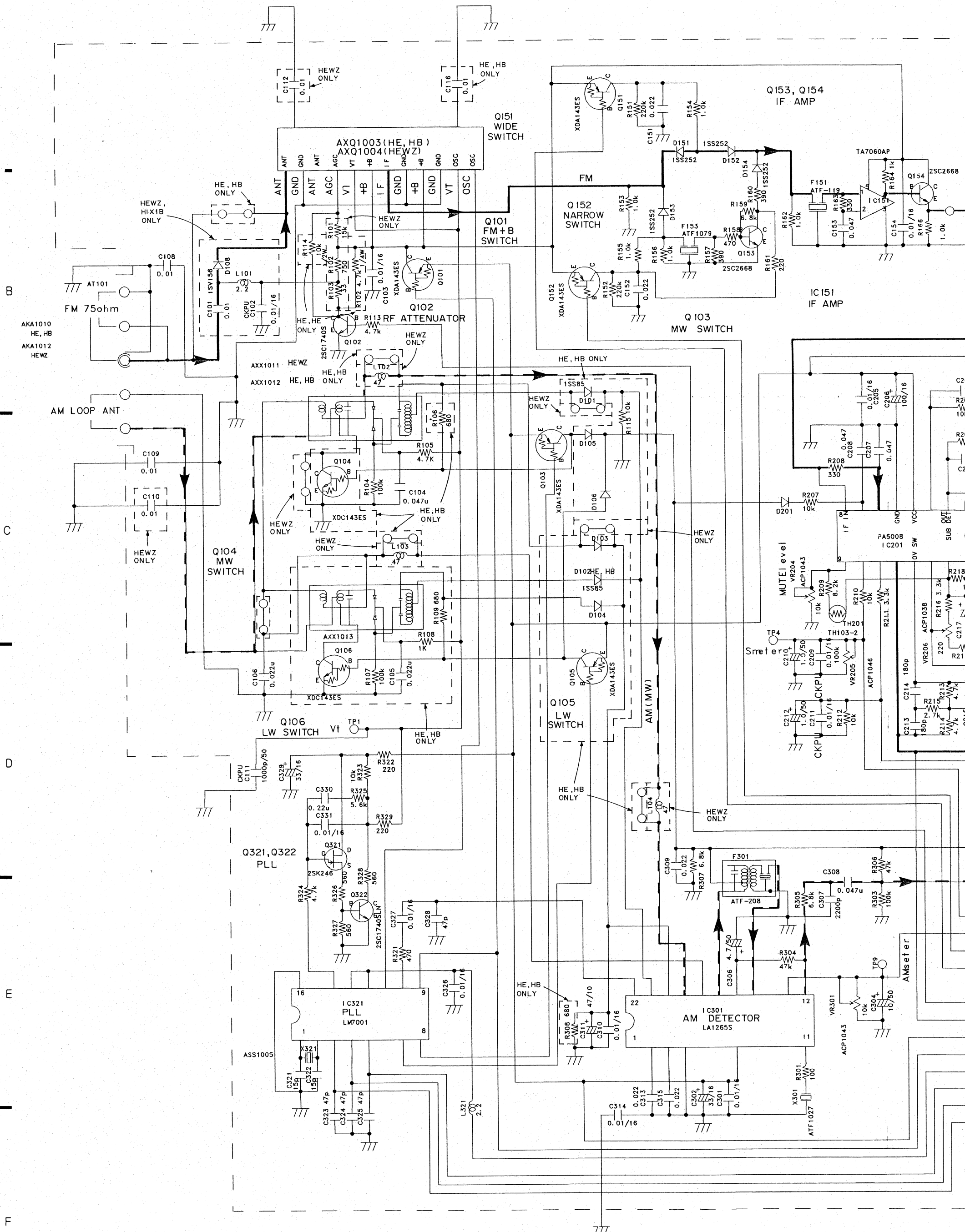
IC351
(NJM78M56FAS)

Pin No.	Volts
V IN	22.0
V OUT	5.6

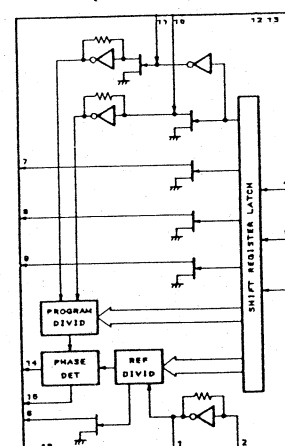
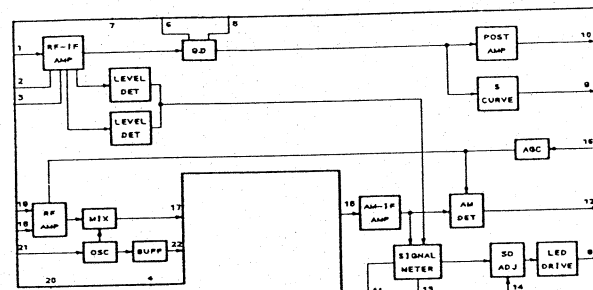
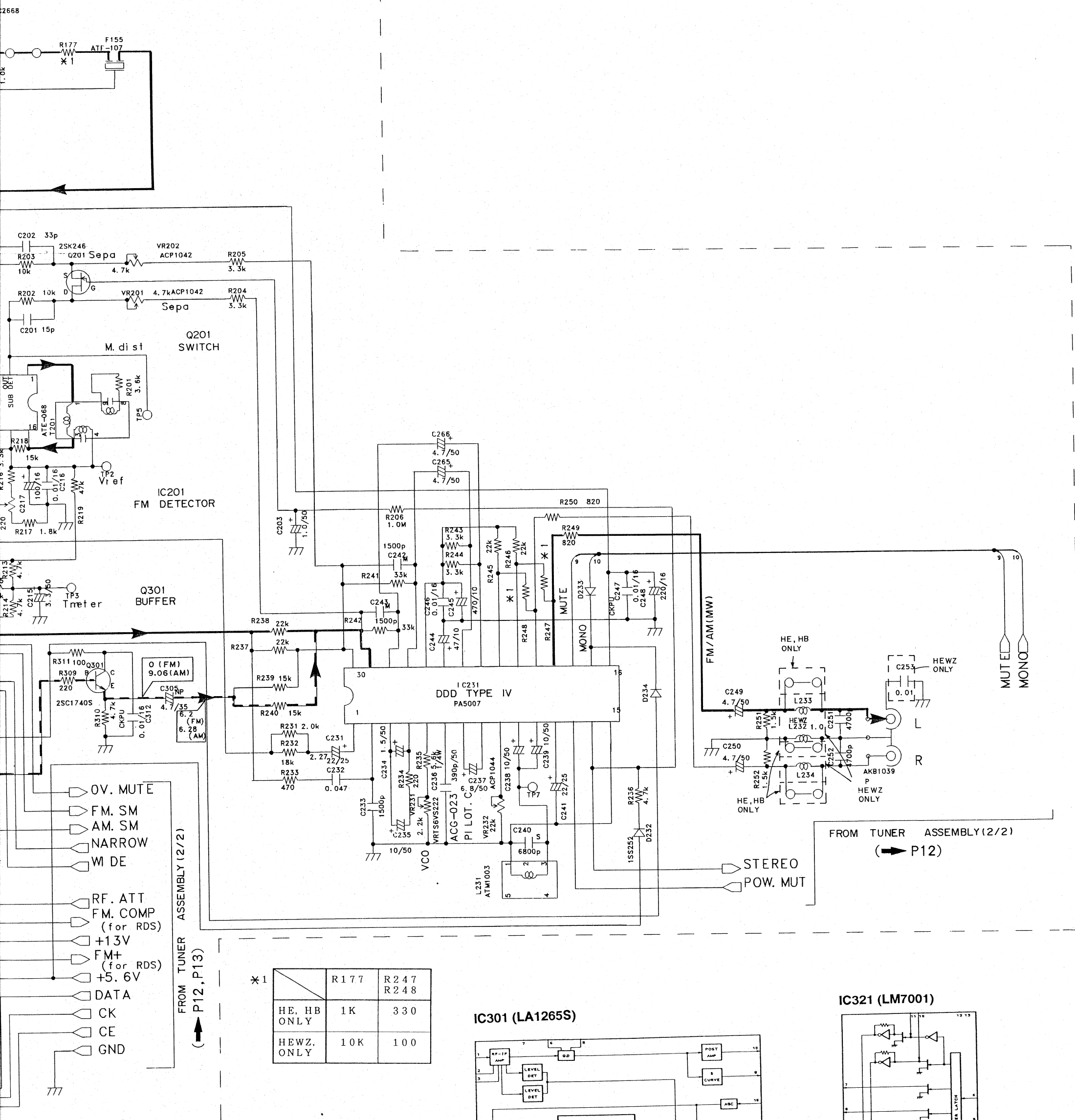
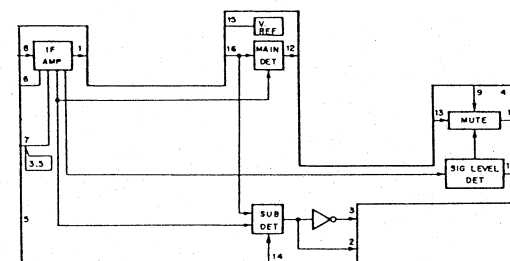
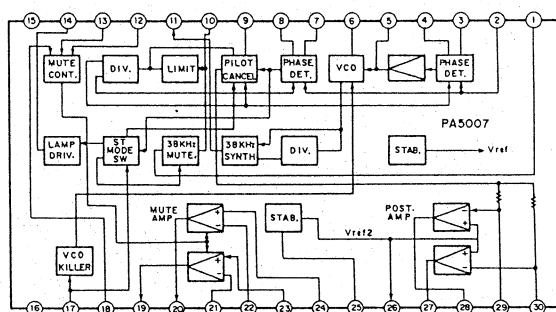
IC352
(MC7812CT)

Pin No.	Volts
V IN	—
V OUT	12.7

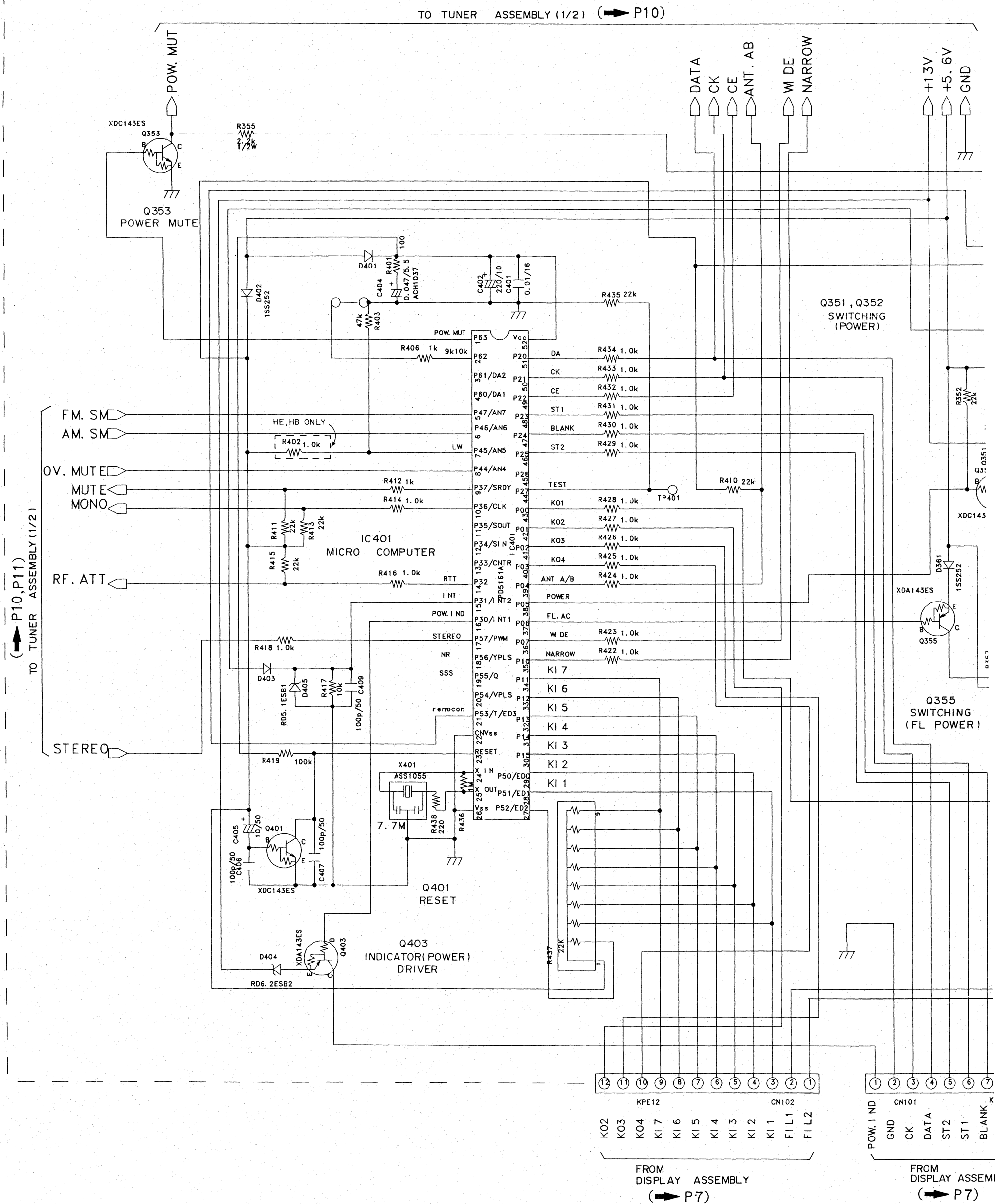
3.2 TUNER ASSEMBLY (1/2) (AWZ3643)



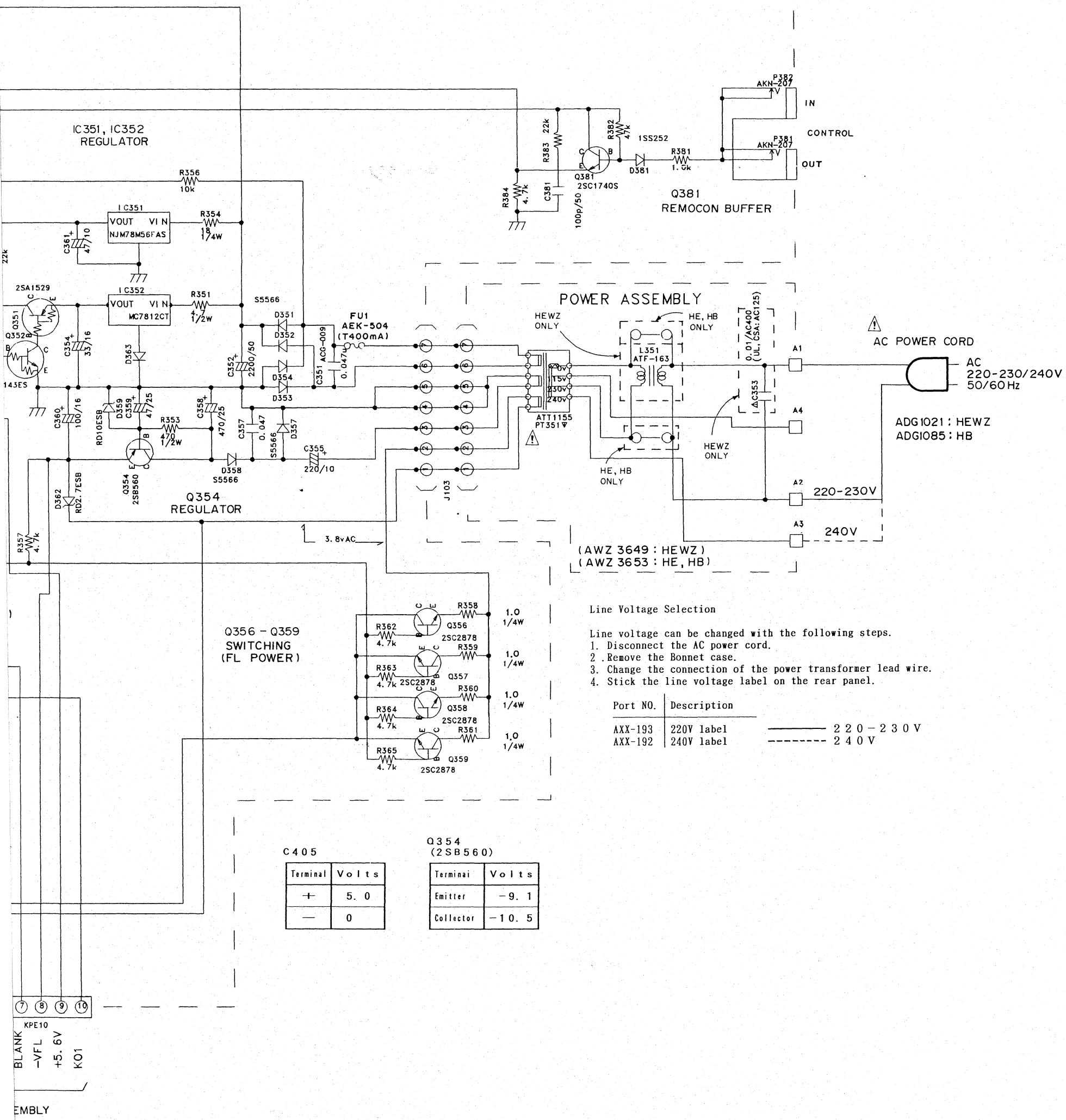
IC201 (PA5008)



3.3 TUNER ASSEMBLY (2/2) (AWZ3643) AND POWER ASSEMBLY (AWZ3649)



TUNER ASSEMBLY (2/2)
(AWZ 3643 : HEWZ)
(AWZ 3647 : HE, HB)



B

C

D

E

F

4. P.C. BOARDS CONNECTION DIAGRAM

NOTE

1. This P.C.B. connection diagram is viewed from the parts mounted side.

2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
		Transistor
		Radiator type transistor
		Diode
		Resistor
		Capacitor (Polarity)
		Capacitor (Non-polarity)

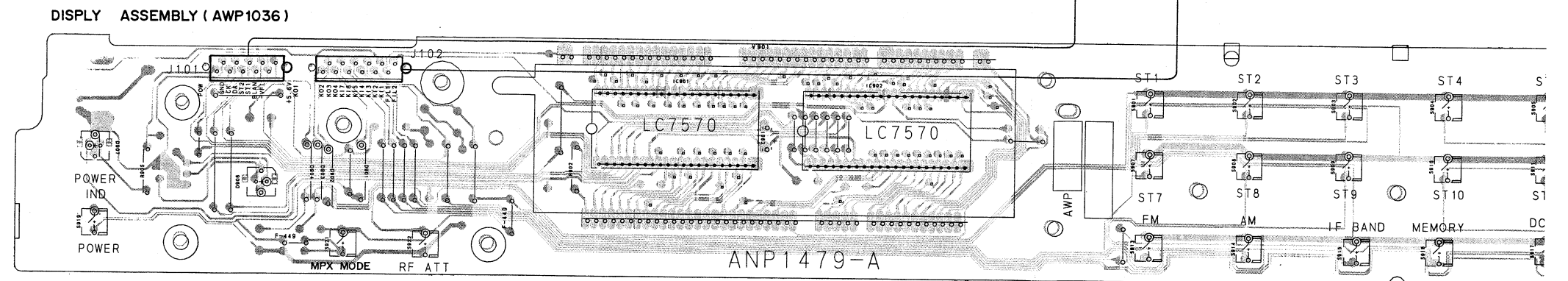
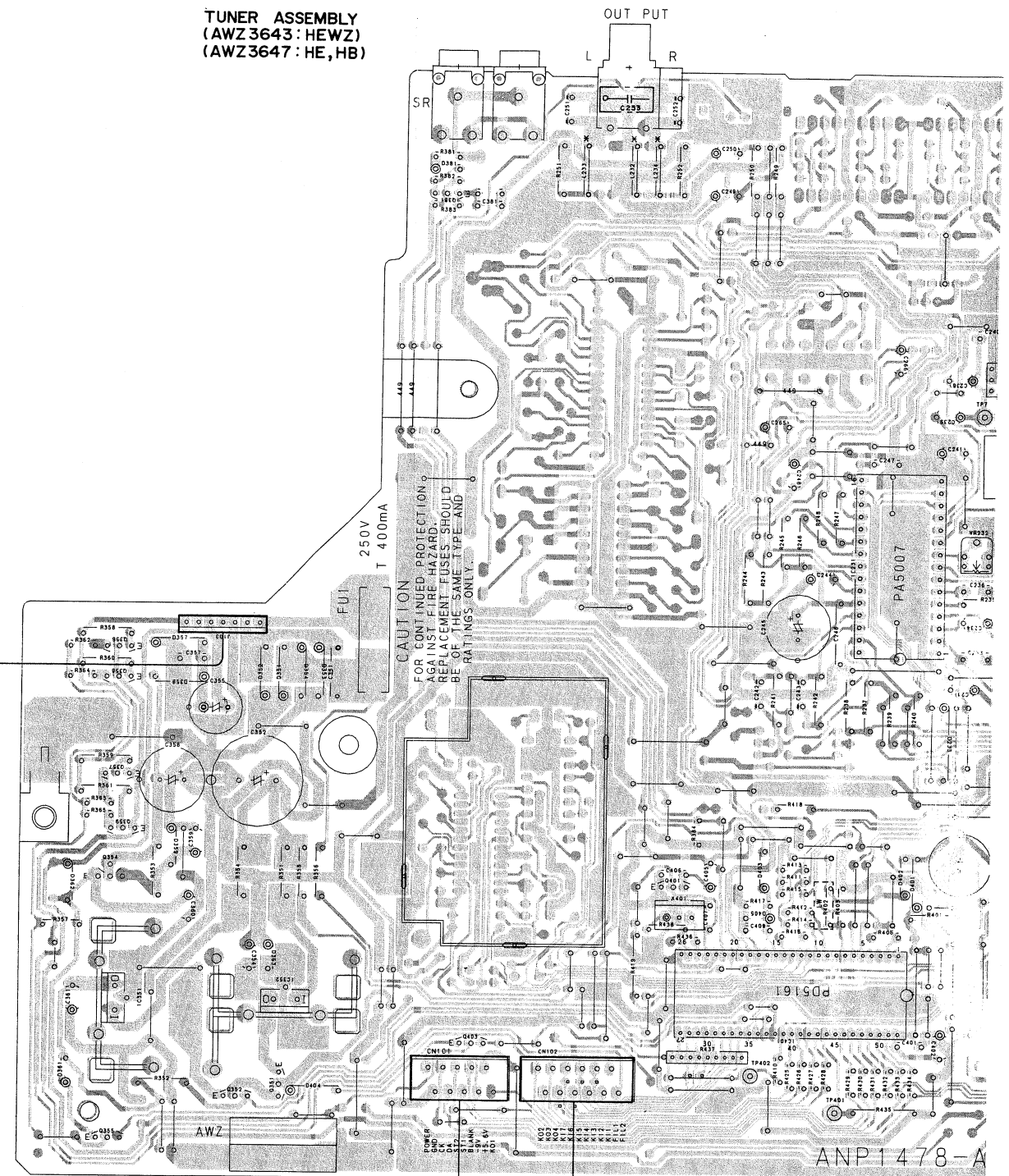
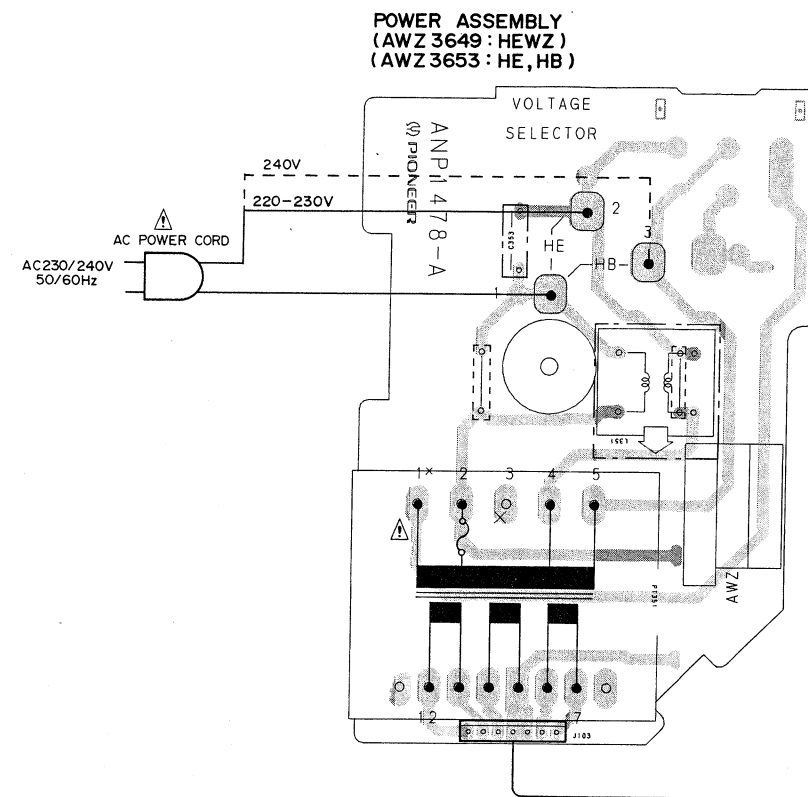
Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

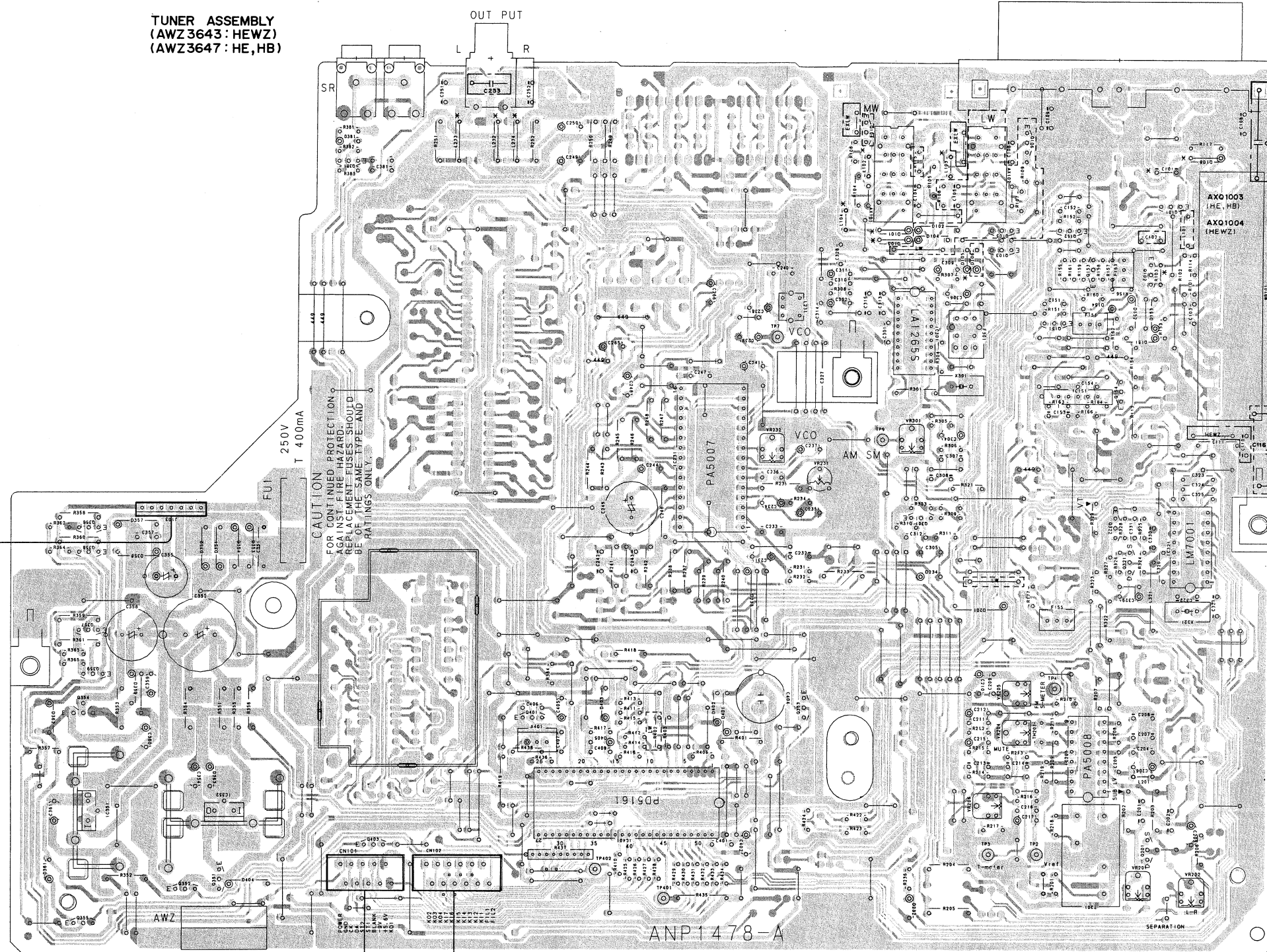
3. The capacitor terminal marked with ⊖ (double circles) shows negative terminal.

4. The diode terminal marked with ⊕ (double circles) shows cathode side.

5. The transistor terminal to which E is affixed shows the emitter.



TUNER ASSEMBLY
(AWZ3643: HEWZ)
(AWZ3647: HE, HB)



Q104 Q106
Q101
Q105 Q152
Q103 Q153
Q102
Q151
IC301
IC151
IC231
Q303 Q322
Q356 IC321
Q358 Q321
Q359
Q354
Q401 Q353
IC201
IC352 IC401
Q201
Q352 Q351
Q355

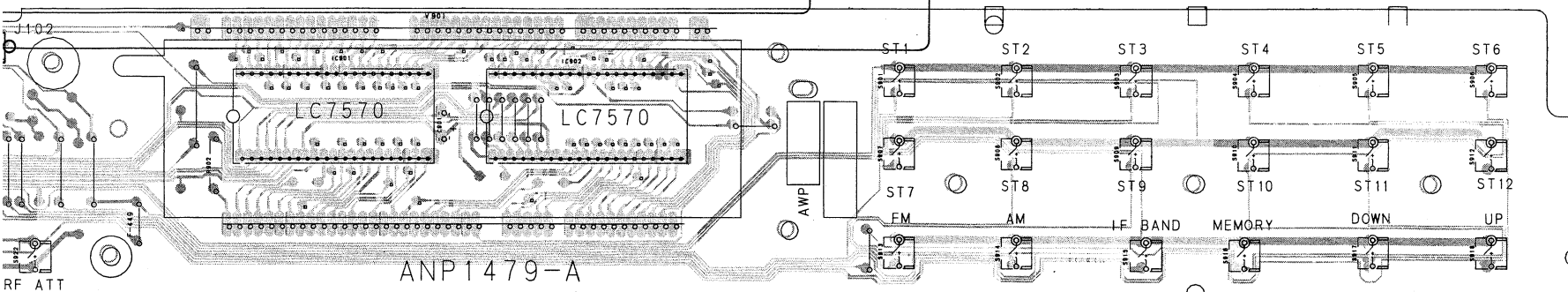
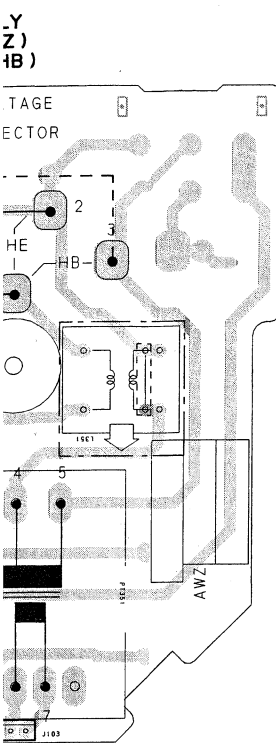
VR301
VR302
VR231
VR205
VR204
VR206
VR201
VR202

A

B

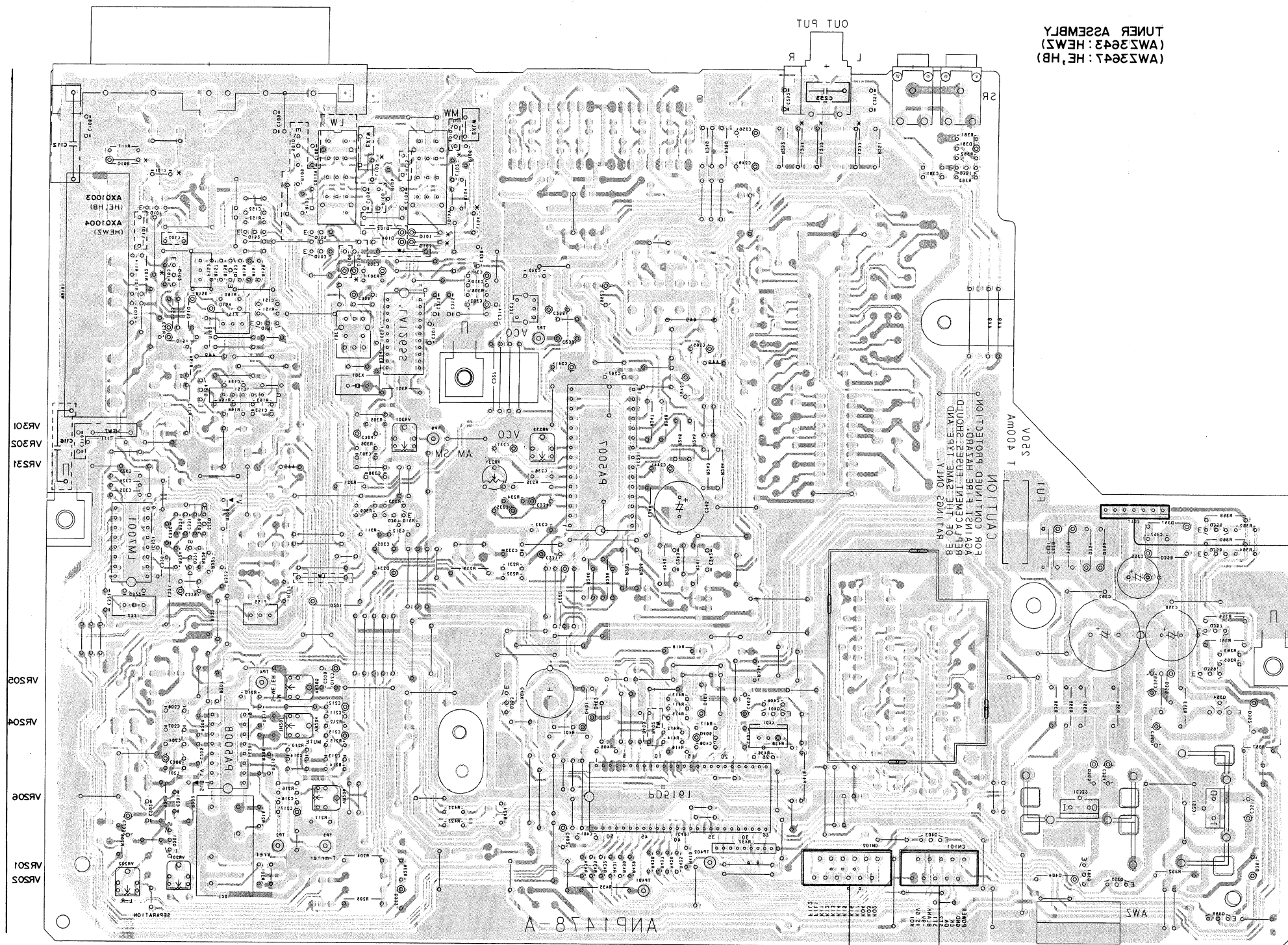
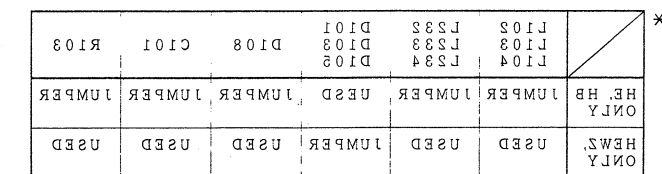
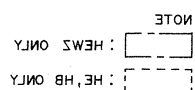
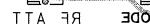
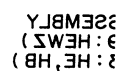
C

D



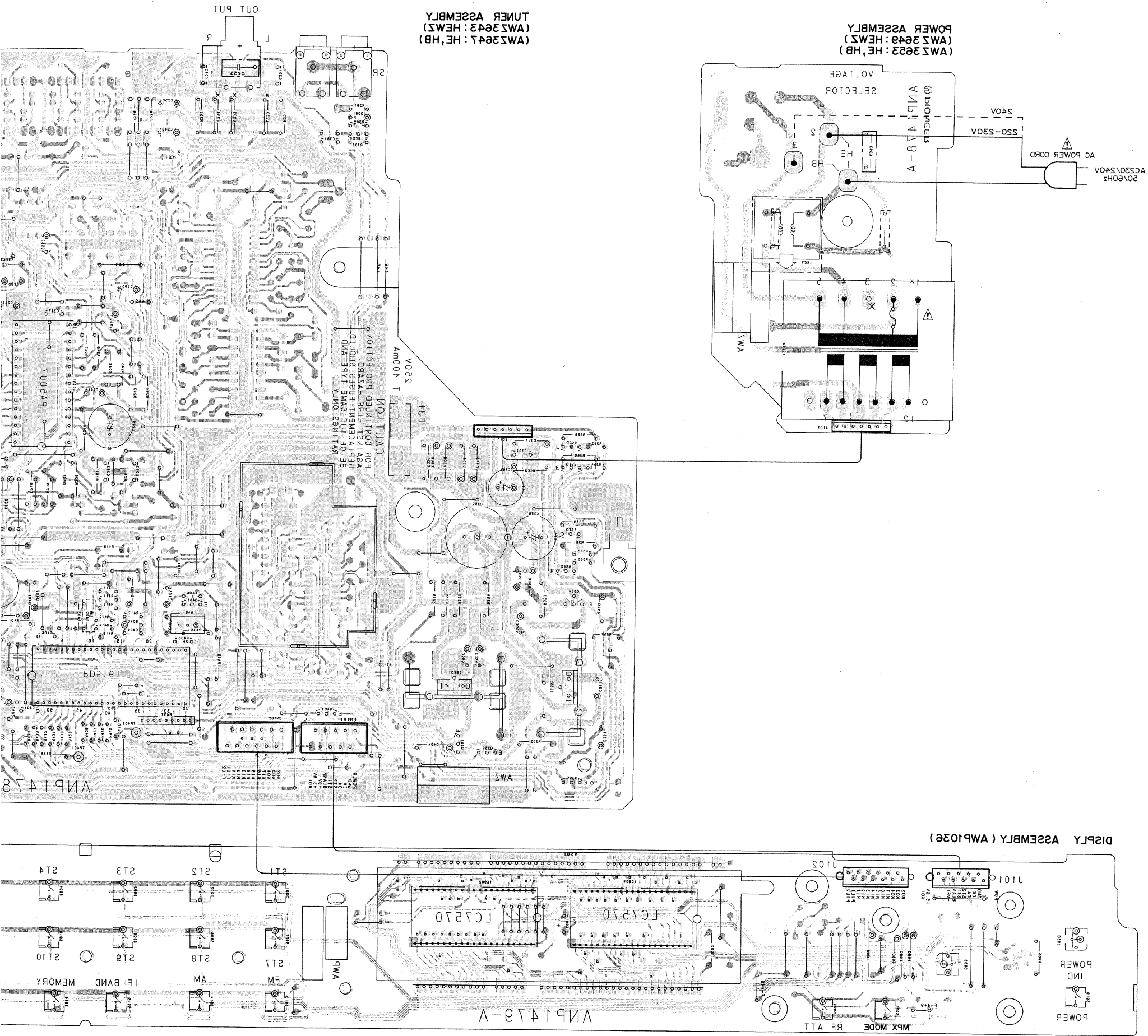
NOTE
[Symbol] : HEWZ ONLY
[Symbol] : HE, HB ONLY

	L102 L103 L104	L232 L233 L234	D101 D103 D105	D108	C101	R103
HE, HB ONLY	JUMPER	JUMPER	UESD	JUMPER	JUMPER	JUMPER
HEWZ ONLY	USED	USED	JUMPER	USED	USED	USED



4. P.C. BOARDS CONNECTION DIAGRAM

• View from soldering side



A

B

C

D

5. P.C.B's PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)

560 Ω \rightarrow $56 \times 10^1 \rightarrow 561$ RD1/4PS $\begin{bmatrix} 5 & 6 & 1 \end{bmatrix}$ J

47k Ω \rightarrow $47 \times 10^3 \rightarrow 473$ RD1/4PS $\begin{bmatrix} 4 & 7 & 3 \end{bmatrix}$ J

0.5 Ω \rightarrow 0R5 RN2H $\begin{bmatrix} 0 & R & 5 \end{bmatrix}$ K

1 Ω \rightarrow 010 RS1P $\begin{bmatrix} 0 & 1 & 0 \end{bmatrix}$ K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω \rightarrow $562 \times 10^1 \rightarrow 5621$ RN1/4SR $\begin{bmatrix} 5 & 6 & 2 & 1 \end{bmatrix}$ F

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
⊙ TUNER ASSEMBLY(AWZ3643)							
SEMICONDUCTORS							
	IC151	AMPLIFIER IC	TA7060AP		D381	DIODE	1SS252
	IC201	FM IC	PA5008		D401-403	DIODE	1SS252
	IC231	MPX IC	PA5007		D404	ZENER DIODE	RD6, 2ESB2
	IC301	AM/FM IC	LA1265S		D405	ZENER DIODE	RD5, 1ESB1
	IC321	PLL IC	LM7001		TH201	THERMISTOR	TH103-2
	IC351	REGULATOR IC	NJM78M56FAS	COILS/TRANSFORMERS			
	IC352	REGULATOR IC	MC7812CT		L101	AXIAL INDUCTOR	LAU2R2M
	IC401		PD5161A		L102-104	AXIAL INDUCTOR	LAU470K
	Q101	TRANSISTOR	XDA143ES		L231	COIL	ATM1003
	Q102	TRANSISTOR	2SC1740S		L232	AXIAL INDUCTOR	LAU010M
	Q103	TRANSISTOR	XDA143ES		L233, 234	AXIAL INDUCTOR	LAU100K
	Q151, 152	TRANSISTOR	XDA143ES		L321	AXIAL INDUCTOR	LAU2R2M
	Q153, 154	TRANSISTOR	2SC2668		T201	IF TRANSFORMER	ATE-068
	Q201	N-FET	2SK246		F151	CERAMIC FILTER	ATF-119
	Q301	TRANSISTOR	2SC1740S		F153	CERAMIC FILTER	ATF1079
	Q321	N-FET	2SK246		F155	CERAMIC FILTER	ATF-107
	Q322	TRANSISTOR	2SC1740SLN		F301	CERAMIC FILTER	ATF-208
	Q351	TRANSISTOR	2SA1529	CAPACITORS			
	Q352, 353	TRANSISTOR	XDC143ES		C101	CERAMIC CAPACITOR	CKDYX103M25
	Q354	TRANSISTOR	2SB560		C102, 103	CERAMIC CAPACITOR	CKPUYY103M16
	Q355	TRANSISTOR	XDA143ES		C104	CERAMIC CAPACITOR	CKDYF473Z50
	Q356-359	TRANSISTOR	2SC2878		C106	CERAMIC CAPACITOR	CKDYF223Z50
	Q381	TRANSISTOR	2SC1740S		C108-110	CERAMIC CAPACITOR	CKDYX103M25
	Q401	TRANSISTOR	XDC143ES		C111	CERAMIC CAPACITOR	CKPUYB102K50
	Q403	TRANSISTOR	XDA143ES		C112	CERAMIC CAPACITOR	CKDYX103M25
	D108	DIODE	1SV156		C151, 152	CERAMIC CAPACITOR	CKDYF223Z50
	D151-154	DIODE	1SS252		C153	CERAMIC CAPACITOR	CKDYX473M25
	D201	DIODE	1SS252		C154	CERAMIC CAPACITOR	CKPUYY103M16
	D232-234	DIODE	1SS252		C201	CERAMIC CAPACITOR	CCMCH150J50
Δ	D351-354	DIODE	S5566		C202	CERAMIC CAPACITOR	CCMCH330J50
Δ	D357, 358	DIODE	S5566		C203	ELECTR. CAPACITOR	CEAS010M50
	D359	ZENER DIODE	RD10ESB		C205	CERAMIC CAPACITOR	CKPUYY103M16
	D361	DIODE	1SS252		C206	ELECTR. CAPACITOR	CEAS101M16
	D362	ZENER DIODE	RD2, 7ESB		C207, 208	CERAMIC CAPACITOR	CKDYX473M25
	D363	DIODE	1SS252		C209	CERAMIC CAPACITOR	CKPUYY103M16
					C210	ELECTR. CAPACITOR	CEAS010M50
					C211	CERAMIC CAPACITOR	CKPUYY103M16
					C212	ELECTR. CAPACITOR	CEAS010M50

Mark	No.	Description	Part No.
	C213, 214	CERAMIC CAPACITOR	CKMYB181K50
	C215	ELECTR. CAPACITOR	CEAS3R3M50
	C216	CERAMIC CAPACITOR	CKPUYY103M16
	C217	ELECTR. CAPACITOR	CEAS101M16
	C231	ELECTR. CAPACITOR	CEAS220M25
	C232	AUDIO FILM CAPACITOR	CFTXA473J50
	C233	CERAMIC CAPACITOR	CKDYB152K50
	C234	ELECTR. CAPACITOR	CEAS1R5M50
	C235	ELECTR. CAPACITOR	CEAS100M50
	C236	CKA (390P/50V)	ACG-023
	C237	ELECTR. CAPACITOR	CEAS6R8M50
	C238, 239	ELECTR. CAPACITOR	CEAS100M50
	C240	PL. STYRENE CAPACITOR	CQSA682J50
	C241	ELECTR. CAPACITOR	CEAS220M25
	C242, 243	MYLOR FILM CAPACITOR	CQMA152J50
	C244	ELECTR. CAPACITOR	CEAS470M10
	C245	ELECTR. CAPACITOR	CEAS471M10
	C246, 247	CERAMIC CAPACITOR	CKPUYY103M16
	C248	ELECTR. CAPACITOR	CEAS221M16
	C249, 250	ELECTR. CAPACITOR	CEAS4R7M50
	C251, 252	CERAMIC CAPACITOR	CKDYB472K50
	C253	CERAMIC CAPACITOR	CKDYX103M25
	C265, 266	ELECTR. CAPACITOR	CEAS4R7M50
	C301	CERAMIC CAPACITOR	CKPUYY103M16
	C302	ELECTR. CAPACITOR	CEAS330M16
	C304	ELECTR. CAPACITOR	CEAS100M50
	C305	ELECTR. CAPACITOR	CEANP4R7M35
	C306	ELECTR. CAPACITOR	CEAS4R7M50
	C307	CERAMIC CAPACITOR	CKDYB222K50
	C308	CERAMIC CAPACITOR	CKDYX473M25
	C309	CERAMIC CAPACITOR	CKDYF223Z50
	C310	CERAMIC CAPACITOR	CKPUYY103M16
	C311	ELECTR. CAPACITOR	CEAS470M10
	C312	CERAMIC CAPACITOR	CKPUYY103M16
	C313	CERAMIC CAPACITOR	CKDYF223Z50
	C314	CERAMIC CAPACITOR	CKPUYY103M16
	C315	CERAMIC CAPACITOR	CKDYF223Z50
	C321, 322	CERAMIC CAPACITOR	CCMCH150J50
	C323-325	AXIAL CERAMIC C.	CCPUSL470J50
	C326, 327	CERAMIC CAPACITOR	CKPUYY103M16
	C328	AXIAL CERAMIC C.	CCPUSL470J50
	C329	ELECTR. CAPACITOR	CEAS330M16
	C330	AUDIO FILM CAPACITOR	CFTXA224J50
	C331	CERAMIC CAPACITOR	CKPUYY103M16
△	C351	CAPACITOR (CERAMIC)	ACG-009
	C352	ELECTR. CAPACITOR	CEAS222M50
	C354	ELECTR. CAPACITOR	CEAS330M16
	C355	ELECTR. CAPACITOR	CEAS221M10
	C357	CERAMIC CAPACITOR	CKDYF473Z50
	C358	ELECTR. CAPACITOR	CEAS471M25
	C359	ELECTR. CAPACITOR	CEAS470M25
	C360	ELECTR. CAPACITOR	CEAS101M16
	C361	ELECTR. CAPACITOR	CEAS470M10
	C381	CERAMIC CAPACITOR	CKPUYB101K50

Mark	No.	Description	Part No.
	C401	CERAMIC CAPACITOR	CKPUYY103M16
	C402	ELECTR. CAPACITOR	CEAS221M10
	C404	CEA (47000/5.5V)	ACH1037
	C405	ELECTR. CAPACITOR	CEAS100M50
	C406, 407	CERAMIC CAPACITOR	CKPUYB101K50
	C409	CERAMIC CAPACITOR	CKPUYB101K50
RESISTORS			
	R101	CARBONFILM RESISTOR	RD1/8PM□□□J
	R102	CARBONFILM RESISTOR	RD1/2PM□□□J
	R103-105	CARBONFILM RESISTOR	RD1/8PM□□□J
	R113	CARBONFILM RESISTOR	RD1/8PM□□□J
	R151-164	CARBONFILM RESISTOR	RD1/8PM□□□J
	R166	CARBONFILM RESISTOR	RD1/8PM□□□J
	R177	CARBONFILM RESISTOR	RD1/8PM□□□J
	R201-219	CARBONFILM RESISTOR	RD1/8PM□□□J
	R231-234	CARBONFILM RESISTOR	RD1/8PM□□□J
	R235	METALFILM RESISTOR	RN1/4PQ□□□□F
	R236-252	CARBONFILM RESISTOR	RD1/8PM□□□J
	R301	CARBONFILM RESISTOR	RD1/8PM□□□J
	R303-307	CARBONFILM RESISTOR	RD1/8PM□□□J
	R309-311	CARBONFILM RESISTOR	RD1/8PM□□□J
	R321-329	CARBONFILM RESISTOR	RD1/8PM□□□J
	R351	CARBONFILM RESISTOR	RD1/2PM□□□J
	R352	CARBONFILM RESISTOR	RD1/8PM□□□J
	R353	CARBONFILM RESISTOR	RD1/2PM□□□J
△	R354	FUSIBLE RESISTOR	RFA1/4PS□□□J
	R355	CARBONFILM RESISTOR	RD1/2PM□□□J
	R356, 357	CARBONFILM RESISTOR	RD1/8PM□□□J
	R358-361	CARBONFILM RESISTOR	RD1/4PM□□□J
	R362-365	CARBONFILM RESISTOR	RD1/8PM□□□J
	R381-384	CARBONFILM RESISTOR	RD1/8PM□□□J
	R401	CARBONFILM RESISTOR	RD1/8PM□□□J
	R403	CARBONFILM RESISTOR	RD1/8PM□□□J
	R406	CARBONFILM RESISTOR	RD1/8PM□□□J
	R410-419	CARBONFILM RESISTOR	RD1/8PM□□□J
	R422-436	CARBONFILM RESISTOR	RD1/8PM□□□J
	R437	RESISTOR ARRAY (22K)	RA8T□□□J
	R438	CARBONFILM RESISTOR	RD1/8PM□□□J
	VR201, 202	VR	ACP1042
	VR204	VR	ACP1043
	VR205	VR	ACP1046
	VR206	VR	ACP1038
	VR231	VR	VRTS6VS222
	VR232	VR	ACP1044
	VR301	VR	ACP1043
OTHERS			
	SCREW		ABA-298
	ANTENNA TERMINAL 2-P		AKA1012
	PIN JACK (2P)		AKB1039
	JACK		AKN-207
	FRONT END MODULE ASSEMBLY		AXQ1004
	AM RF TUNING BLOCK		AXX1011
	CN101	CONNECTOR (10P)	KPE10
	CN102	CONNECTOR (12P)	KPE12

Mark	No.	Description	Part No.
	X301	CERAMIC RESONATOR	ATF1027
	X321	CRYSTAL RESONATOR	ASS1005
	X401	CERAMIC RESONATOR	ASS1055

⊙ POWER ASSEMBLY(AWZ3649)

COILS/TRANSFORMERS

△	L351	FILTER	ATF-163
△	T351	POWER TRANSFORMER	ATT1155

CAPACITORS

△	C353	CKA (0.01/AC400V)	ACG1002
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DISPLAY ASSEMBLY(AWP1036)

SEMICONDUCTORS

	IC901, 902	FL STATIC DRIVER IC	LC7570
	D901-904	DIODE	1SS252
	D907	LED	AEL1072

SWITCHES

	S901-919	SWITCH	ASG1034
	S921, 922	SWITCH	ASG1034

CAPACITORS

	C901	CERAMIC CAPACITOR	CKPUYY103M16
--	------	-------------------	--------------

RESISTORS

	R902	CARBONFILM RESISTOR	RD1/8PM□□□J
	R905	CARBONFILM RESISTOR	RD1/8PM□□□J

OTHERS

	V901	FL TUBE	AAV1095
--	------	---------	---------

FRONT END MODULE ASSEMBLY (AXQ1004)

The component parts of Front End Module assembly (AXQ1004) cannot be supplied.

6. ADJUSTMENTS

6.1 FM TUNER ADJUSTMENTS

- Connect as shown in Fig. 6-1.

6.1.1 FM MONO

Step	Adjustment name	FM SG (1 kHz \pm 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	T meter adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-B	Adjust so that the voltage between TP2 and TP3 becomes 0 ± 100 mV.
2	MONO distortion adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-A	Adjust so that the distortion becomes minimum.
3	Sub-balance adjustment	98 MHz	MONO	60 dB μ	98 MHz NORMAL	VR206	Adjust so that the AC voltage at IC201 pin 2 becomes minimum.

6.1.2 FM STEREO

Step	Adjustment name	FM SG (1 kHz \pm 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	VCO adjustment	108 MHz	OFF	60 dB μ	108 MHz	VR231	Adjust so that the output at TP7 becomes $38 \text{ kHz} \pm 100 \text{ Hz}$.
2	Pilot cancel	107 MHz	PILOT ONLY	60 dB μ	107 MHz NORMAL	VR232	Adjust so that the AC voltage at output terminal becomes minimum. (MAX LPF: OFF)
3	Separation adjustment	89 MHz	R-ONLY	60 dB μ	89 MHz NORMAL	VR202	Adjust so that the separation R \rightarrow L becomes maximum.
4			L-ONLY	60 dB μ	89 MHz NORMAL	VR201	Adjust so that the separation L \rightarrow R becomes maximum.

Stereo modulation: Main $1 \text{ kHz L+R} \pm 68.25 \text{ Hz}$, Pilot $19 \text{ kHz} \pm 6.75 \text{ kHz}$.

6.1.3 FM ETC

Step	Adjustment name	FM SG (1 kHz \pm 75 kHz dev.)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	S meter adjustment	99 MHz	MONO	75 dB μ	99 MHz NORMAL	VR205	Adjust so that the voltage between TP4 and GND becomes $4.9^{+0.05}_{-0.1}$ V.
2	Muting level adjustment	99 MHz	MONO	12 dB μ	99 MHz NORMAL	VR204	Adjust so that the muting is released at the input level shown on the left.

6.2 AM TUNER ADJUSTMENTS

- Connect as shown in Fig. 6-2.

Step	Adjustment name	FM SG (400 Hz 30% modulation)			FL display, IF BAND etc.	Location	Adjustment
		Frequency	Modulation	Level			
1	Tracking adjustment * 1	603 kHz	OFF	Low input level	603 kHz	ANT coil of MW block	Adjust so that the voltage between TP9 and GND becomes maximum.
		1395 kHz	OFF	Low input level	1395 kHz	TC101	
2	IFT adjustment * 1	603 kHz	OFF	Low input level	603 kHz	F301	
3	S meter adjustment	1008 kHz	ON	74 dB μ V/m	1008 kHz	VR301	Adjust so that the voltage between TP9 and GND becomes 2.5 ± 0.05 V.

* 1: Adjustment only for HIX1B.

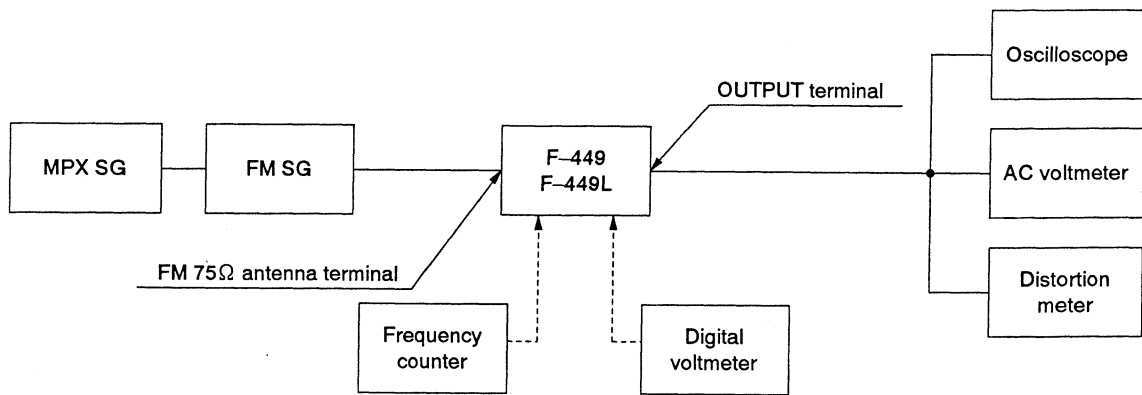


Fig. 6-1 FM Tuner Connection

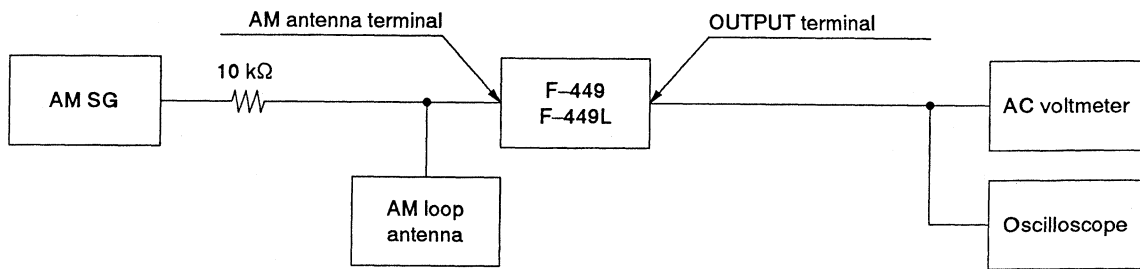


Fig. 6-2 AM Tuner Connection

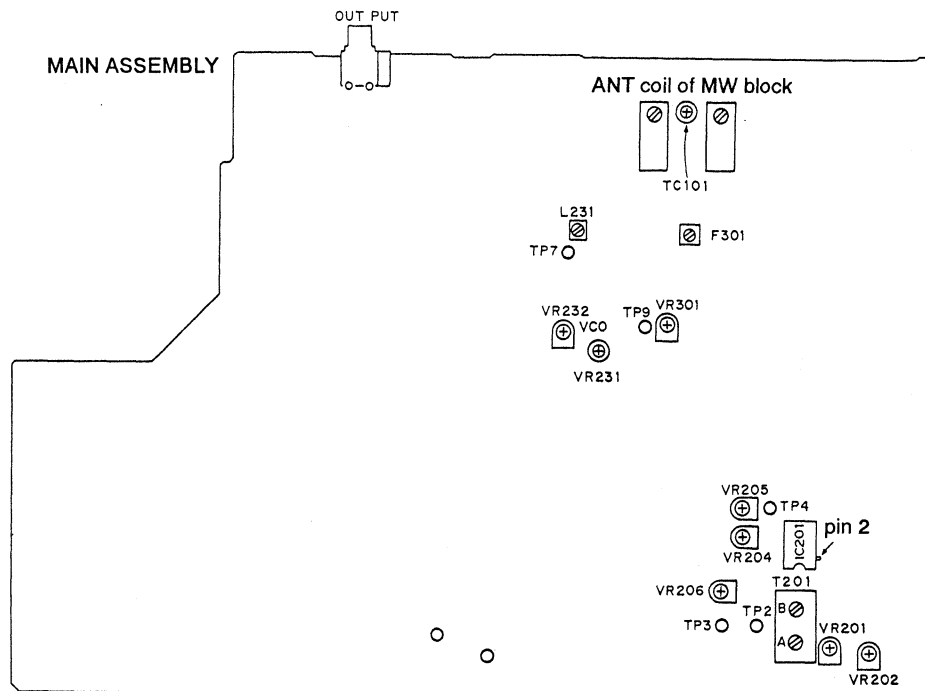


Fig. 6-3 Adjusting Point

6. RÉGLAGES

6.1 RÉGLAGES DU SYNTONISEUR FM

- Raccorder comme indiqué à la figure 6-1.

6.1.1 MONO FM

Etape	Nom du réglage	FM SG (1 kHz \pm 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en T	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-B	Régler afin que la tension entre TP2 et TP3 soit de 0 ± 100 mV.
2	Réglage de distorsion MONO	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-A	Régler afin que la distorsion soit minimale.
3	Réglage de l'équilibre auxiliaire	98 MHz	MONO	60 dB μ	98 MHz NORMAL	VR208	Régler afin que la tension CA à IC201 Broche 2 soit minimale.

6.1.2 STEREO FM

Etape	Nom du réglage	FM SG (1 kHz \pm 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Réglage du VCO	108 MHz	OFF	60 dB μ	108 MHz	VR231	Régler afin que la sortie à TP7 soit de $38 \text{ kHz} \pm 100 \text{ Hz}$
2	Neutralisation pilote	107 MHz	PILOT ONLY	60 dB μ	107 MHz NORMAL	VR232	Régler afin que la tension CA, bornes de sortie, soit minimale. (MAX LPF: HORS CIRCUIT)
3	Réglage de séparation	89 MHz	R-ONLY	60 dB μ	89 MHz NORMAL	VR202	Régler afin que la séparation D \rightarrow G soit maximale.
4			L-ONLY	60 dB μ	89 MHz NORMAL	VR201	Régler afin que la séparation G \rightarrow D soit maximale.

Modulation de stéréo: Principal $1 \text{ kHz L+R} \pm 68,25 \text{ Hz}$, Pilote $19 \text{ kHz} \pm 6,75 \text{ kHz}$.

6.1.3 ETC FM

Etape	Nom du réglage	FM SG (1 kHz \pm 75 kHz dev.)			Affichage FL, GAMME FI, etc.	Emplacement	Réglage
		Fréquence	Modulation	Niveau			
1	Appareil de mesure en S	99 MHz	MONO	75 dB μ	99 MHz NORMAL	VR205	Régler afin que la tension entre TP4 en GND soit $4,9^{+0,05}_{-0,1} \text{ V}$.
2	Réglage de niveau de sourdine	99 MHz	MONO	12 dB μ	99 MHz NORMAL	VR204	Régler afin que la sourdine soit relâchée au niveau d'entrée indiqué sur la gauche.

6.2 RÉGLAGES DU SYNTONISEUR AM

- Raccorder comme indiqué à la figure 6-2.

Etape	Nom du réglage	FM SG (400 Hz 30% modulation)			Affichage FL, GAMME FI, etc.	Réglage	Fréquence
		Modulation	Niveau	Emplacement			
1	Réglage d'alignement * 1	603 kHz	OFF	Niveau bas d'entrée	603 kHz	Bobine ANT du bloc OM	Régler afin que la tension entre TP9 et GND soit maximale.
		1395 kHz	OFF	Niveau bas d'entrée	1395 kHz	TC101	
2	Réglage du transformateur de FI * 1	603 kHz	OFF	Niveau bas d'entrée	603 kHz	F301	
3	Appareil de mesure en S	1008 kHz	ON	74 dB $\mu\text{V/m}$	1008 kHz	VR301	Régler afin que la tension entre TP9 et GND soit $2,5 \pm 0,05 \text{ V}$.

* 1: Réglage pour HIX1B seulement.

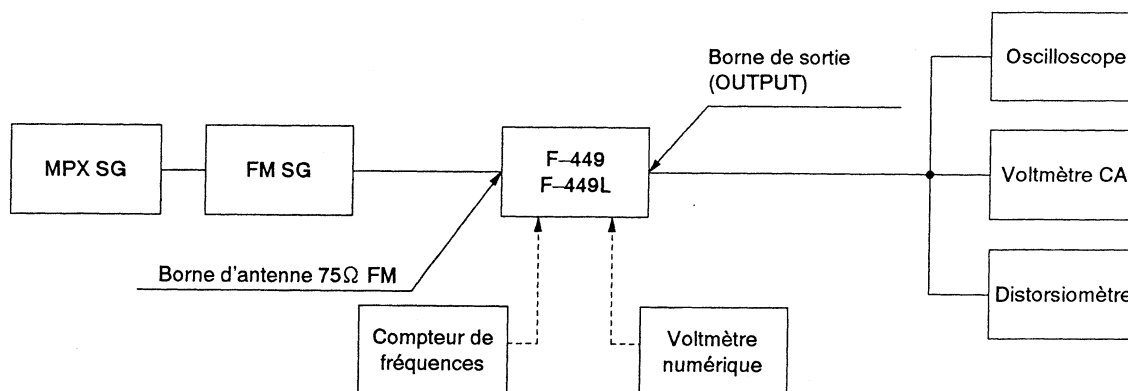


Fig. 6-1 Branchement du syntoniseur FM

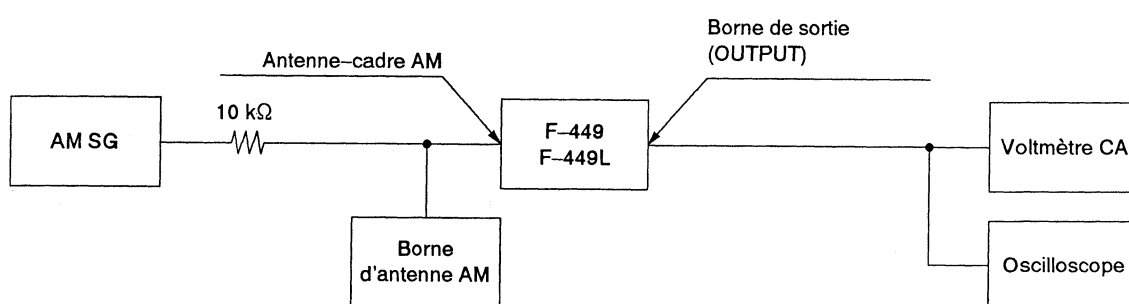


Fig. 6-2 Branchement du syntoniseur FM

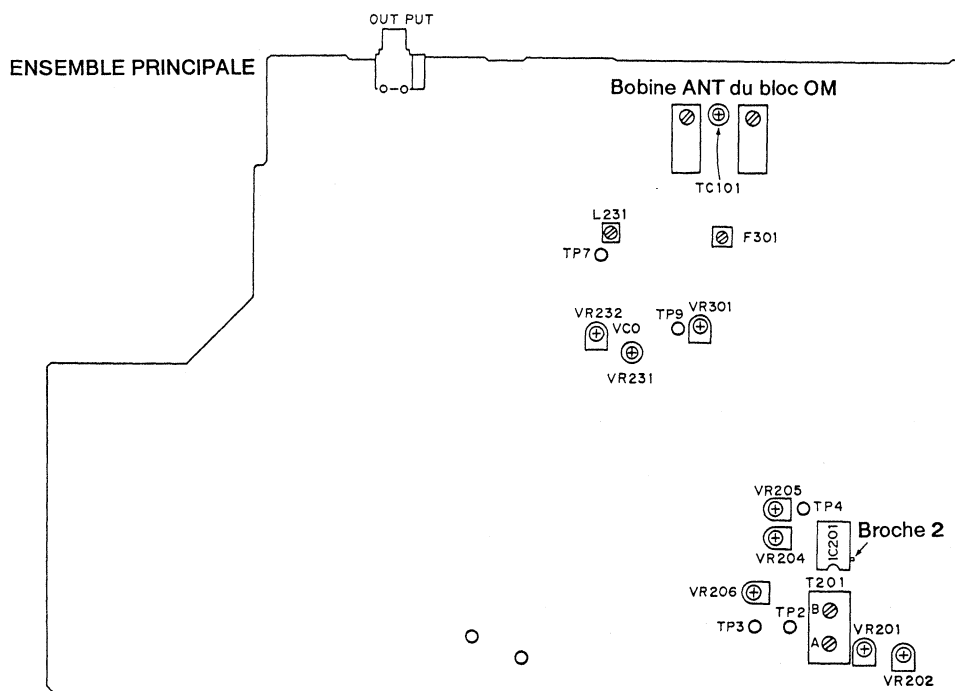


Fig. 6-3 Point de réglage

6. AJUSTES

6.1 AJUSTES DEL SINTONIZADOR DE FM

- Conecte como indica la Fig. 6-1.

6.1.1 FM MONO

Paso	Ajuste	FM SG (1 kHz \pm 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor T	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-B	Ajuste de modo que la tensión entre TP2 y TP3 sea 0 ± 100 mV.
2	Ajuste de la distorsión monofónica	98 MHz	MONO	60 dB μ	98 MHz NORMAL	T201-A	Ajuste de modo que la distorsión sea mínima.
3	Ajuste del subbalance	98 MHz	MONO	60 dB μ	98 MHz NORMAL	VR206	Ajuste de modo que la tensión de CA en IC201 patilla 2 sea mínima.

6.1.2 FM STEREO

Paso	Ajuste	FM SG (1 kHz \pm 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del VCO	108 MHz	OFF	60 dB μ	108 MHz	VR231	Ajuste de modo que la salida en TP7 sea 38 kHz \pm 100 Hz
2	Cancelación del piloto	107 MHz	PILOT ONLY	60 dB μ	107 MHz NORMAL	VR232	Ajuste de modo que la tensión de, terminales de salida, CA sea mínima (MAX LPF: OFF)
3	Ajuste de la separación	89 MHz	R-ONLY	60 dB μ	89 MHz NORMAL	VR202	Ajuste de modo que la separación R \rightarrow L sea máxima.
4			L-ONLY	60 dB μ	89 MHz NORMAL	VR201	Ajuste de modo que la separación L \rightarrow R sea máxima.

Modulación de estéreo: Principal 1 kHz L+R \pm 68,25 Hz, Piloto 19 kHz \pm 6,75 kHz.

6.1.3 FM ETC

Paso	Ajuste	FM SG (1 kHz \pm 75 kHz dev.)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del medidor S	99 MHz	MONO	75 dB μ	99 MHz NORMAL	VR205	Ajuste de modo que la tensión entre TP4 y masa sea $4,9^{+0,05}_{-0,1}$ V.
2	Ajuste del nivel silenciador	99 MHz	MONO	12 dB μ	99 MHz NORMAL	VR204	Ajuste de modo que el silenciamiento se desconecte en el nivel de entrada mostrado a la izquierda.

6.2 AJUSTES DEL SINTONIZADOR DE AM

- Conecte como indica la Fig. 6-2.

Paso	Ajuste	FM SG (400 Hz 30% modulación)			Visualización fluorescente, banda de FI, etc.	Posición	Ajuste
		Frecuencia	Modulación	Nivel			
1	Ajuste del seguimiento * 1	603 kHz	OFF	Nivel de entrada bajo	603 kHz	Bobina de antena del bloque de MW	Ajuste de modo que la tensión entre TP9 y masa sea máxima.
		1395 kHz	OFF	Nivel de entrada bajo	1395 kHz	TC101	
2	Ajuste del IFT * 1	603 kHz	OFF	Nivel de entrada bajo	603 kHz	F301	
3	Ajuste del medidor S	1008 kHz	ON	74 dB μ V/m	1008 kHz	VR301	Ajuste de modo que la tensión entre TP9 y masa sea $2,5 \pm 0,05$ V

* 1: Ajuste sólo para HIX1B.

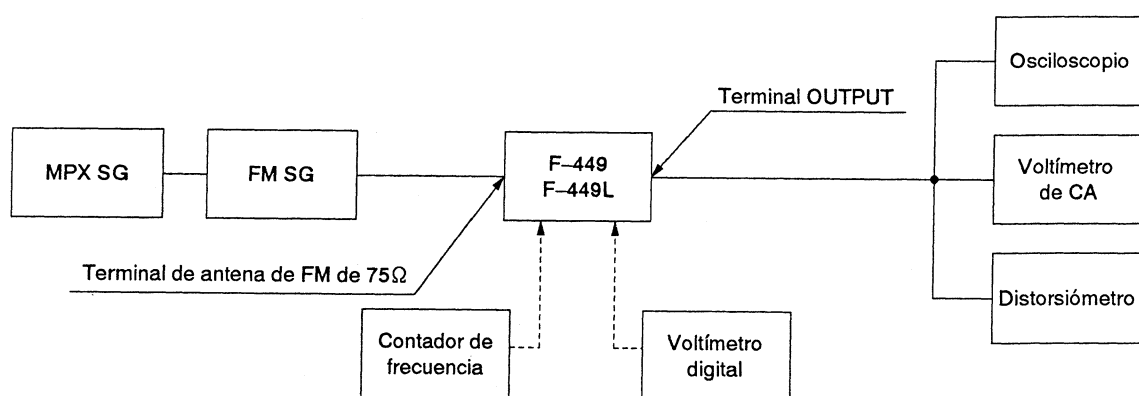


Fig. 6-1 Conexión del sintonizador de FM

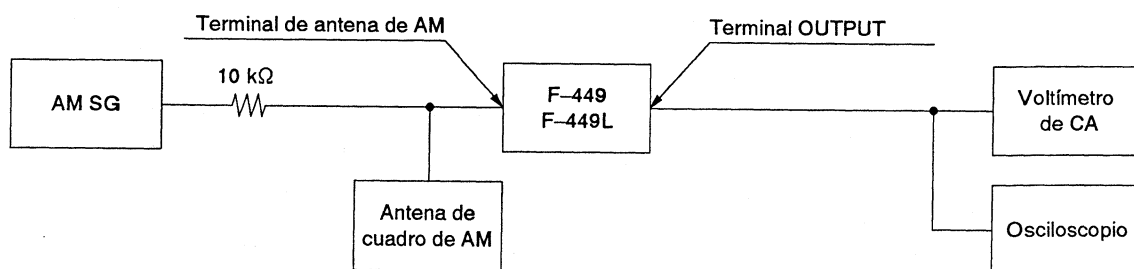


Fig. 6-2 Conexión del sintonizador de AM

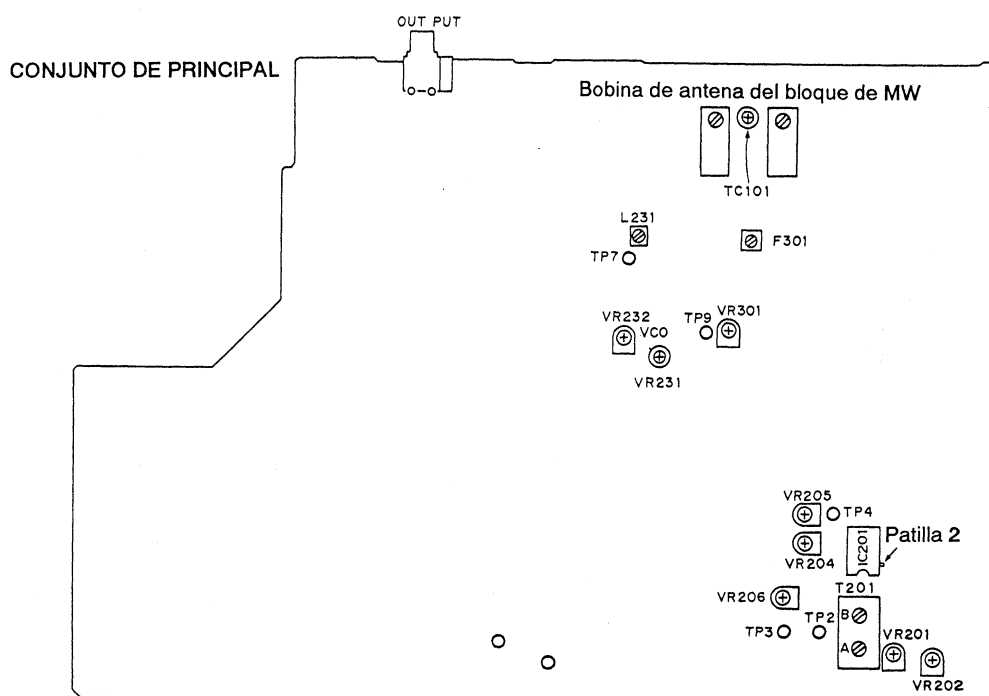


Fig. 6-3 Punto de ajuste

7. FOR F-449L/HE, HB AND F-449-S/HEWZ TYPES

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

The F-449L/HE, HB and F-449-S/HEWZ types are the same as the F-449/HEWZ type with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		F-449/ HEWZ type	F-449L/ HE type	F-449L/ HB type	F-449-S/ HEWZ type	
⊙	TUNER assembly	AWZ3643	AWZ3647	AWZ3647	AWZ3643	
⊙	POWER assembly	AWZ3649	AWZ3653	AWZ3653	AWZ3649	
Δ	AC Power cord	ADG1021	ADG1021	ADG1085	ADG1021	
	Station button	AAD1751	AAD1751	AAD1751	AAD1753	
	Station button	AAD1752	AAD1752	AAD1752	AAD1754	
	Panel base	AMB1842	AMB1842	AMB1842	AMB1843	
	Bonnet	AZN1745	AZN1745	AZN1745	.....
	Bonnet case	.....	.....	.....	AZN1803	
	Screw	ABA1047	.....	.....	ABA1047	
	Screw	BBT30P060FZK	BBT30P060FZK	BBT30P060FZK	.....
	Screw	.....	.....	.....	ABA-274	
	Packing case	AHD2056	AHD2057	AHD2057	AHD2058	
	FM antenna assembly	ADH1002	.....	.....	ADH1002	
	FM antenna	.....	ADH1005	ADH1005	.....
	Operating instructions (German)	ARC1264	.....	.....	ARC1264	
	Operating instructions (English/French/Italian/Spanish/ Portuguese/Dutch/Swedish/German)	.....	ARE1191	.....	.....
	Operating instructions (English)	.....	.....	ARB1314	.....

⊙ TUNER ASSEMBLY (AWZ3647)

The TUNER assembly (AWZ3647) is the same as the TUNER assembly (AWZ3643) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		AWZ3643	AWZ3647	
	L101	LAU2R2M	.....
	L102–L104	LAU470K	.....
	L232	LAU010M	.....
	L233, L234	LAU100K	.....
	D108	1SV156	.....
	D101, D102	.....	1SS85	
	D103–D106	1SS252	.....
	Q104–Q106	.....	XDC143ES	
	C101	CKDYX103M25	.....
	C102	CKPUYY103M16	.....
	C105	.....	CKDYF223Z50	
	C110, C112, C253	CKDYX103M25	.....
	C116	.....	CKDYX103M25	
	R101	RD1/8PM153J	.....
	R102	RD1/2PM751J	RD1/4PM472J	
	R103	RD1/8PM330J	.....
	R106, R109, R308	.....	RD1/8PM681J	
	R107	.....	RD1/8PM104J	
	R108, R402	.....	RD1/8PM102J	
	R114, R115	.....	RD1/8PM103J	
	R247, R248	RD1/8PM103J	RD1/8PM102J	
	R177	RD1/8PM221J	RD1/8PM331J	
	Antenna terminal 2P	AKA1012	.....
	Antenna terminal 4P	.....	AKA1010	
	Front End Module Assembly	AXQ1004	AXQ1003	
	AM RF Tuning Block	AXX1011	.....
	AM RF Tuning Block	.....	AXX1012	
	AM RF Tuning Block	.....	AXX1013	

⊙ POWER ASSEMBLY (AWZ3653)

The POWER assembly (AWZ3653) is the same as the POWER assembly (AWZ3649) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		AWZ3649	AWZ3653	
⚠	C353	ACG1002	.....
⚠	L351	ATF-163	.....

8. SPECIFICATIONS

8.1 TECHNISCHE DTEN (F-449/HEWZ)

UKW-Tunerteil

Frequenzbereich	87,5 bis 108 MHz
Nutzempfindlichkeit	
NORMAL	Mono: 12,1 dBf, IHF (1.1 μ V/75 Ω)
50 dB Empfindlichkeitsschwelle	
NORMAL	Mono: 16,2 dBf, IHF (1.8 μ V/75 Ω)
	Stereo: 36,2 dBf, IHF (17.7 μ V/75 Ω)
Empfindlichkeit (DIN)	
NORMAL	Mono: 0,9 μ V/75 Ω
	Stereo: 28 μ V/75 Ω
Rauschabstand	Mono: 83 dB (bei 80 dBf)
	Stereo: 78 dB (bei 80 dBf)
Verzerrung (bei 80 dBf)	
NORMAL	Mono: 0,2% (1 kHz)
	Stereo: 0,3% (1 kHz)
Ausweichkanal-Trennschärfe	
NORMAL	70 dB (400 kHz)
SUPER NARROW	65 dB (300 kHz)
Stereotrennung	50 dB (1 kHz)
	40 dB (20 Hz bis 10 kHz)
Frequenzgang	± 1 dB (20 Hz bis 15 kHz)
Spiegelselektion	50 dB
ZF-Sicherheit	90 dB
AM-Unterdrückung	60 dB
Nebenwellenunterdrückung	70 dB
Hilfsträgerunterdrückung	55 dB
Ansprechschwelle für Geräuschsperre	23,2 dBf (4 μ V/75 Ω)
Antenneneingang	75 Ω unsymmetrisch

8.2 SPECIFICATIONS (F-449L/HE)

FM Tuner Section

Frequency range	87.5 MHz to 108 MHz
Usable Sensitivity	
NORMAL	Mono: 12.1 dBf, IHF (1.1 μ V/75 Ω)
50 dB Quieting Sensitivity	
NORMAL	Mono: 16.2 dBf, IHF (1.8 μ V/75 Ω)
	Stereo: 36.2 dBf, IHF (17.7 μ V/75 Ω)
Sensitivity (DIN)	
NORMAL	Mono: 0.9 μ V/75 Ω
	Stereo: 28 μ V/75 Ω
Signal-to-Noise Ratio	Mono: 83 dB (at 80 dBf)
	Stereo: 78 dB (at 80 dBf)
Signal-to-Noise Ratio (DIN)	Mono: 72 dB
	Stereo: 65 dB
Distortion (at 80 dBf)	
NORMAL	Mono: 0.2 % (1 kHz)
	Stereo: 0.3 % (1 kHz)
Alternate Channel Selectivity	
NORMAL	70 dB (400 kHz)
SUPER NARROW	65 dB (300 kHz)
Stereo Separation	50 dB (1 kHz)
	40 dB (20 Hz to 10 kHz)
Frequency Response	± 1 dB (20 Hz to 15 kHz)
Image Response Ratio	50 dB
IF Response Ratio	90 dB
AM Suppression Ratio	60 dB
Spurious Response Ratio	70 dB
Subcarrier Product Ratio	55 dB
Muting Threshold	23.2 dBf (4 μ V/75 Ω)
Antenna Input	75 Ω unbalanced

MW-Tunerteil

Frequenzbereich	531 kHz bis 1.602 kHz (Step 9 kHz)
Empfindlichkeit (IHF, Rahmenantenne)	300 μ V/m
Trennschärfe	30 dB
Rauschabstand	50 dB
Spiegelselektion	40 dB
ZF-Sicherheit	50 dB
Antenne	Rahmenantenne

Audioteil

Ausgang (Pegel/Impedanz)	
UKW (100% Mod.)	650 mV/0,9 k Ω
MW (30% Mod.)	150 mV/0,9 k Ω

Sonstiges

Netzanschluß	Wechselstrom 220 — 230 V, 50/60 Hz
Leistungsaufnahme	15 W
Abmessungen	420 (B) x 86 (H) x 316 (T) mm
Gewicht (ohne Verpackung)	3,4 kg

Mitgeliefertes Zubehör

T-förmige UKW-Antenne	1
MW-Rahmenantenne	1
Cinch-Anschlußkabel	1
Bedienungsanleitung	1
Steuerungskabel	1

HINWEIS:

Änderungen der technischen Daten und des Designs zum Zwecke der Verbesserung vorbehalten.

AM (MW) Tuner Section

Frequency range	531 kHz to 1,602 kHz (9 kHz step)
Sensitivity (IHF, Loop antenna)	300 μ V/m
Selectivity	30 dB
Signal-to-Noise Ratio	50 dB
Image Response Ratio	40 dB
IF Response Ratio	50 dB
Antenna	Loop Antenna

LW Tuner Section

Frequency range	153 kHz to 281 kHz
Sensitivity (IHF, Loop antenna)	1,000 μ V/m
Antenna	Loop Antenna

Audio Section

Output (Level/Impedance)	
FM (100 % MOD)	650 mV/0.9 k Ω
AM (30 % MOD)	150 mV/0.9 k Ω

Miscellaneous

Power requirements	a.c. 220 — 230 Volts ~, 50/60 Hz
Power Consumption	15 W
Dimensions	420 (W) x 86 (H) x 316 (D) mm
Weight (without package)	3.4 kg

Furnished Parts

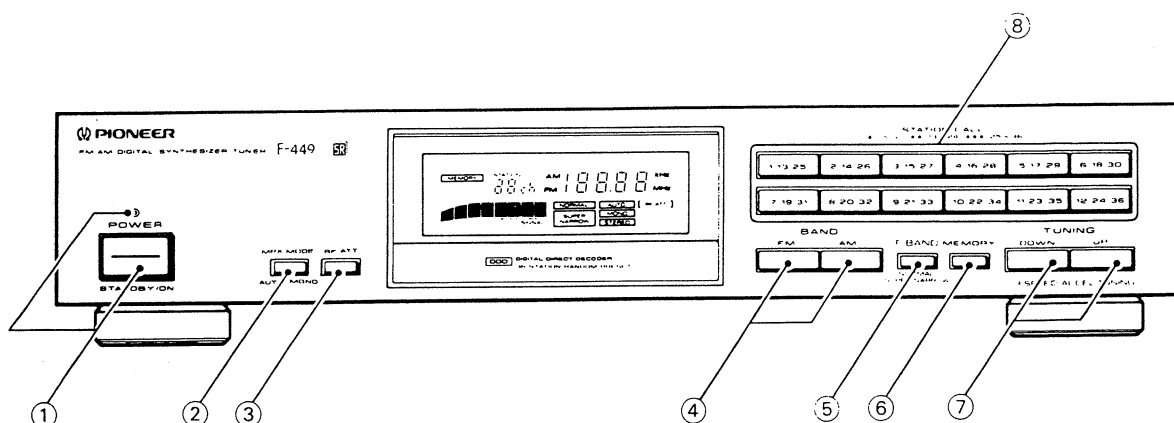
FM T-type Antenna	1
AM Loop Antenna	1
Connecting Cord with Pin Plugs	1
Operating Instructions	1
Control cord	1

NOTE:

Specifications and design subject to possible modification without notice due to improvements.

9. PANEL FACILITIES

9.1 BEDIENELEMENTE AUF DER VORDERSEITE (F-449/HEWZ)



① Netzschalter (POWER, STANDBY/ON) mit Anzeige

Bei eingeschaltetem Strom, leuchtet die Anzeige.

ON (ein) Wenn der Schalter auf die Position ON gestellt ist, wird Strom zugeführt und das Gerät ist betriebsbereit.

STANDBY

(Bereitschaft) ... Wenn der Schalter auf die Position STANDBY gestellt ist, wird der Haupt-Stromzufluß abgeschaltet und das Gerät ist nicht länger vollständig bedienbar. Ein Stromzufluß von einer Minute reicht aus, um das Gerät wieder in Betriebsbereitschaft zu versetzen.

HINWEIS:

- Die Festsender bleiben dauerhaft gespeichert, solange das Gerät an einer Steckdose angeschlossen ist.
- Nach dem Abtrennen des Netzkabels bleiben die Daten im Festsenderspeicher noch einige Tage lang erhalten.

② Multiplex-Betriebsartenschalter (MPX MODE)

Beim Betätigen dieses Schalters wird nach folgendem Schema zur jeweils nächsten Betriebsart gewechselt:



Beim MW-Empfang ist dieser Schalter funktionslos.

AUTO:

Die Rundfunksendungen werden, abhängig vom eingestellten Sender, automatisch in Stereo oder Mono empfangen.

Die **AUTO** -Anzeige leuchtet.

HINWEIS:

Wenn der Signalpegel für ausreichend guten Empfang zu schwach ist, wird der Ton automatisch stummgeschaltet.

MONO:

Zum Empfang von Stereosendern in Mono.

Die **MONO** -Anzeige leuchtet.

HINWEIS:

Die Einstellung des Schalters wird beim Einspeichern eines Senders zusammen mit der Sendefrequenz gespeichert.

③ Schalter für HF-Dämpfung (RF ATT)

Das HF-Dämpfungsglied kann durch Drücken dieses Schalters aktiviert werden (Anzeige RF ATT leuchtet), um beim Empfang eines stark einfallenden Senders (Nahsender) Tonverzerrungen zu reduzieren. Das HF-Dämpfungsglied sollte normalerweise ausgeschaltet bleiben.

HINWEIS:

Dieser Tastenzustand ist für jeden Sender im Senderspeicher voreingestellt.

④ Wellenbereich-Wahltasten (BAND)

FM (UKW):

Für den Empfang von UKW-Sendungen.

AM (MW):

Für den Empfang von MW-Sendungen.

⑤ Bandbreitenschalter (IF BAND)

Bei jedem Tastendruck, schaltet die Bandbreite der IF-Schaltung zwischen "normal" und "super schmal" für den UKW-Wellenbereich. Die gewählte Bandbreite wie folgt angezeigt:

Die **NORMAL** oder **SUPER NARROW** Anzeige leuchtet auf.

Wenn von anderen Sendern Störungen auftreten, stellen Sie diesen Schalter auf SUPER NARROW.

HINWEIS:

Die Einstellung des Schalters wird beim Einspeichern eines Senders zusammen mit der Sendefrequenz gespeichert.

⑥ Speichertaste (MEMORY)

Diese Taste ist zum Einspeichern eines Festsenders zu drücken.

Die Anzeige **MEMORY** leuchtet danach einige Sekunden lang, wobei der eingestellte Sender innerhalb dieses Zeitraums durch Betätigen einer der Festsendertasten (STATION CALL) gespeichert werden kann. Siehe auf der Seite 8 für weitere Einzelheiten zur Bedienung.

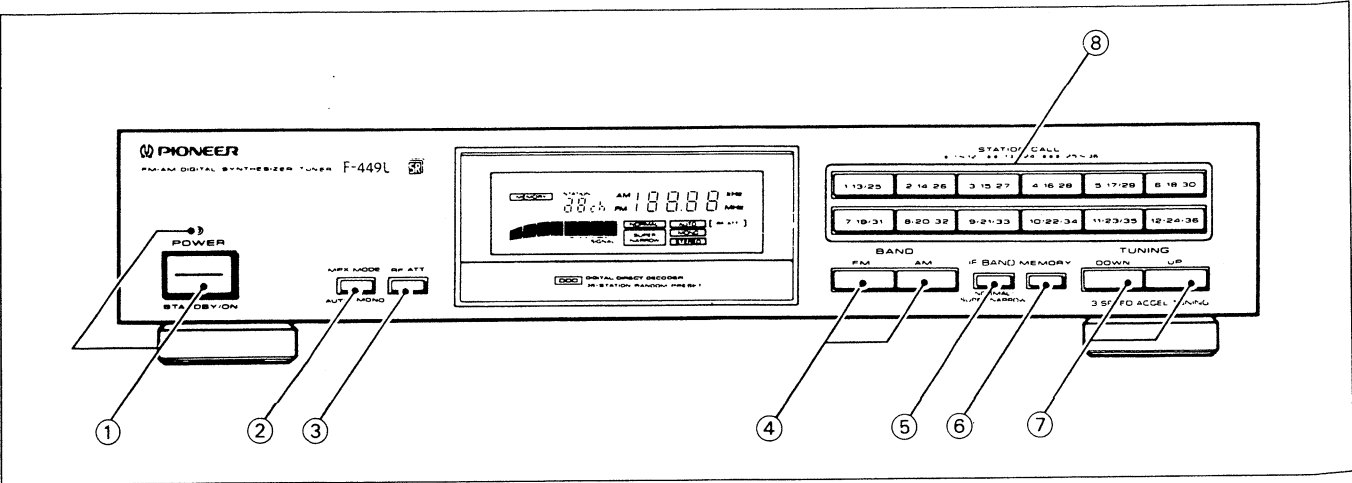
⑦ Abstimmtasten (TUNING UP/DOWN)

Diese Tasten dienen zum Abstimmen des Tuners auf die jeweilige Sendefrequenz. Zur Einstellung frequenzmäßig höherer Sender als der gegenwärtig abgestimmte, ist hierbei die UP -Taste zu drücken und für frequenzmäßig tiefere Sender die DOWN -Taste.

⑧ Festsendertasten (STATION CALL)

In den Speicherplätzen dieser Tasten können beliebige Sendefrequenzen für späteren Abruf auf Tastendruck vorgespeichert werden.

9.2 PANEL FACILITIES



① POWER (STANDBY/ON) switch/indicator
When the power is on, indicator lights.
ON When set to ON position, power is supplied and the unit becomes operational
STANDBY .. When set to STANDBY position, the main power flow is cut and the unit is no longer fully operational. A minute flow of power feeds the unit to maintain operation readiness.

NOTE:
• The memory will be backed up so long as the power cord is not unplugged.
• If the power cord is unplugged, the memory will be retained for several days.

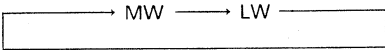
② MPX (multiplex) MODE button
Mode changes as follows each time this button is pressed:

→ AUTO → MONO →

This button does not affect AM reception.
AUTO:
Depending on the broadcast station, STEREO or MONO is automatically selected.
AUTO indicator lights up.
NOTE:
When the signal level is too weak for reception, sound output is automatically muted.
MONO:
To receive stereo broadcasts in monaural.
MONO indicator lights up.
NOTE:
This button's status is preset for each station in station memory.

③ RF ATT button
Set this switch to ON when receiving strong FM signals (nearby stations) to reduce sound distortion ([RF ATT] indicator lights).
Normally, this switch should be set to OFF.
NOTE:
This button's status is preset for each station in station memory.

④ BAND selector buttons
FM:
Press to receive FM broadcasts.
AM:
Press to receive AM broadcasts.
Each time you press this button, the band switches in the following way.



⑤ IF BAND button
Each time this button is pressed the bandwidth of the IF circuit switches between "normal" and "super narrow" for the FM band.
The selected bandwidth is displayed as follows:
The **NORMAL** or **SUPER NARROW** indicator lights up.
Set to SUPER NARROW in case of interference from other stations.
NOTE:
This button's status is preset for each station in station memory.

⑥ MEMORY button
Press to memorize preset stations. The **MEMORY** indicator will remain lit for several seconds. Press the desired STATION CALL buttons to memorize it during this period.
See page 10 for operational details.

⑦ TUNING UP/DOWN buttons
Use these buttons to tune in broadcasting stations. Press UP to receive a station whose frequency is higher than the displayed frequency, and DOWN to tune into a lower frequency station.

⑧ STATION CALL buttons
Use these buttons to preset stations and to receive already preset stations.